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Measuring the Costs of Voting and their Impacts

by

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Abstract: Measuring the Costs of Voting and their Impacts

Although much literature in political science refers to the costs of voting, they have not been comprehensively studied. I develop a new theory of costs based on both the tasks needed to vote and their attendant individual-specific trade-offs. I then use an original survey to demonstrate that perceived task difficulty measures perform well for measuring these costs. Finally, I look at the impact of these costs on both validated voter turnout and intention to vote.

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Chapter 1: Conceptualizing and Measuring the Costs of Voting

I. Introduction

Over the last few decades, much ink has been spilled over the effects of various voting reforms and their effects on voter turnout. Some of these reforms target registration, including the motor-voter registration process implemented after HAVA and relaxing of registration deadlines through same day/Election Day registration. Policies increasing the places and times available to vote such as early voting and Election Day Vote Centers (EDVCs) form another type of voting reform that has increased in popularity over time. Other voting reforms have aimed to make voting more convenient by increasing access to mail balloting. These include providing absentee ballots without excuse, permanent absentee lists, and at the extreme, universal vote by mail in which every vote is cast on a mailed ballot. Finally, a recent push by the Republican Party to reduce the risk of voting fraud resulted in some states adopting strict voter ID laws that require showing state-issued ID to vote.

Most of these reforms were adopted with the goal of increasing voter turnout, sometimes accompanied by the desire to reduce the cost of election administration as well. The exception here is voter ID, for which the laws have been aimed at reducing fraud (or decreasing minority voter turnout, depending on who you ask). Regardless of lawmakers' goals when adopting these reforms, scholars examining the effects of these laws have generally approached them from the perspective of their effects on the costs of voting. Registration reforms, early voting, and mail-assisted voting are usually seen as reducing the costs of voting, while strict voter ID is seen as increasing the costs of voting to those without photo ID. To understand why this framework is applied and what it means, a brief digression into the rational utility model of voting is in order.

I. i. Framework: The Rational Model of Voting

The rational utility model of voting, which was first developed by Downs (1957) and formalized by Riker & Ordeshook (1968), begins with the assumption that humans are rational actors who pursue goals efficiently through a process of weighing utilities of actions. In this model, voters compare the expected gain in utility of voting for their preferred party against the costs of casting this vote. In the strict economic utility form of this model, the benefits of voting are a potential voter's expected utility benefit from his favored party winning multiplied by the probability that he casts the decisive vote in the election. If the costs of voting are high, it is rational for those with low expected benefits to not turn out to vote.

Of course, since the expected utility of a tie-breaking vote is generally too small to predict a positive economic utility of turnout for almost all voters, scholars expanded the model beyond economic utility by adding a term for "civic duty" as another benefit of voting. There are other benefits of voting that could be included as well, such as the emotional value of expressing one's views and the social status (or avoided social shaming) granted by being seen as a voter. Although including these benefits moves the model beyond the original economic utility model, they are not incompatible with a generalized model of rational utility as long as voters weigh the costs of voting against these benefits. A key feature of this model is that the cost-benefit calculation is based on the perceived costs and the perceived benefits to the voter (Aldrich 1993). The objective value of a vote, or the objective cost of casting it, do not matter as much as the voter's perception of these costs and benefits and which side of the equation outweighs the other.

When considering how voting reforms affect voter participation, scholars have employed this extended rational model of voting as the mechanism between the policies and their effects. Voting reforms like mail-assisted voting lower the costs of casting a ballot by, for example, eliminating the cost of traveling to the polling place. As a result of these lowered costs, some potential voters will now perceive that the benefits of voting outweigh the costs, while before they saw the

costs as higher. This leads this group of voters whose decision calculus "flipped" to now turn out to vote, which should increase overall voter turnout. This general theory is applied to all forms of convenience voting reforms, including Election Day registration, early voting, and vote by mail. In the case of strict voter ID, which is thought to increase the costs of voting for a sub-population, the theory predicts lower turnout due to the higher costs for some voters outweighing their perceived benefits of voting.

II. Motivation: The Puzzle of Voting Reforms

If we observed that voting reforms that we think reduce costs consistently increase turnout, and voting reforms that increase costs consistently decrease it, then this theory would seem both a plausible and relatively complete explanation of the mechanism connecting reforms to participation. However, the collection of literature on this topic does not consistently show the effects on turnout that the rational theory predicts. Studies on early voting have found no increase in turnout following the adoption of early voting (Leighley & Nagler 2013; Gronke, Galanes-Rosenbaum, and Miller 2007; Neeley and Richardon 2001; Stein 1998) and states that have early voting show lower turnout than others except when they also have same day registration (Burden et al. 2014). Mail-assisted voting has shown inconsistent effects that include some positive effects on turnout (Menger, Stein, & Vonnahme 2015; Gerber, Huber, & Hill 2013; Richey 2008; Gronke, Galanes-Rosenbaum, and Miller 2007), but also include null effects (Gronke & Miller 2012; Southwell 2009) and negative effects (Kousser & Mullin 2007). Voter ID has also shown a mixture of effects, with some studies failing to find any effect (Alvarez et al. 2008; Ansolabehere 2009; Mycoff, Wagner, & Wilson 2009) or actually finding a backlash effect of increasing turnout (Citrin, Green, & Levy 2014).

The only type of voting reform that has substantially increased turnout consistently across multiple studies is registration reforms. More lenient registration deadlines, where the voter can register closer to Election Day, substantially increase voter turnout (Wolfinger & Rosenstone 1978, 1980; Leighley

& Nagler 2013). Motor-voter and online voter registration also have a small positive effect on voter turnout (Leighley & Nagler 2013; Franklin & Grier 1997; Knack 1995), although there has been some disagreement on the effects of motor-voter (Martinez & Hill 2001). Further expanding the registration period to include early voting days and Election Day has an additional positive effect (Knack & White 2000; Brians & Grofman 2001; Burden et al. 2014). Why have voting reforms that change registration policies had more consistently positive effects on turnout than other voting reforms? The literature does not provide a compelling answer to this question, other than the primacy of registration to voting access.

If we assume that voting reforms are affecting the costs of voting, the rational model of voting predicts clear effects on voter turnout. Yet, most types of voting reforms fail to consistently show these predicted effects. Even registration reforms, which have the most consistent findings of positive turnout effects, result in only modest changes in turnout (Brians & Grofman 2001; Highton 2004; Burden et al. 2014). Why do we not consistently observe substantively large changes in turnout from these reforms? There are two possible reasons for these findings. One is that the voting reforms are not affecting the costs of voting substantially. If this is the case, the costs of voting are not changing enough to affect turnout. The other possibility is that the reforms are affecting costs, but at the same time are also affecting other factors that affect voting. If this is the case, then the policies could decrease costs and make it easier to vote, but could end up reducing overall voter turnout because they also reduce the benefits of casting a ballot.

Unfortunately, it is very difficult to determine which possibility may be creating the mixed findings on the effects of voting reforms. Studies on these laws have generally treated the mechanism between the policy and turnout as a "black box" and have not examined the causal mechanism between the policy, costs, and turnout. Instead of looking at how much a reform reduces the costs of voting, and then how much that reduction increases turnout, they simply include voting reforms as dummy variables and look at the effect of the policies directly on turnout. The diagram shown in Figure 1a shows the pathway that these studies purport to be

testing, but Figure 1b shows the pathway they actually test, which runs straight from the policies to participation.

Figure 1a: Pathway Purportedly Tested

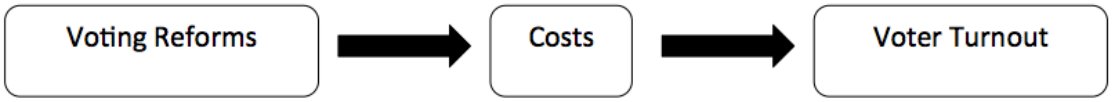
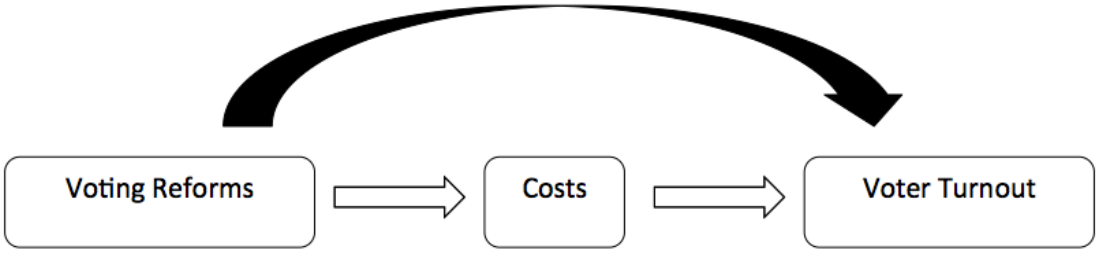


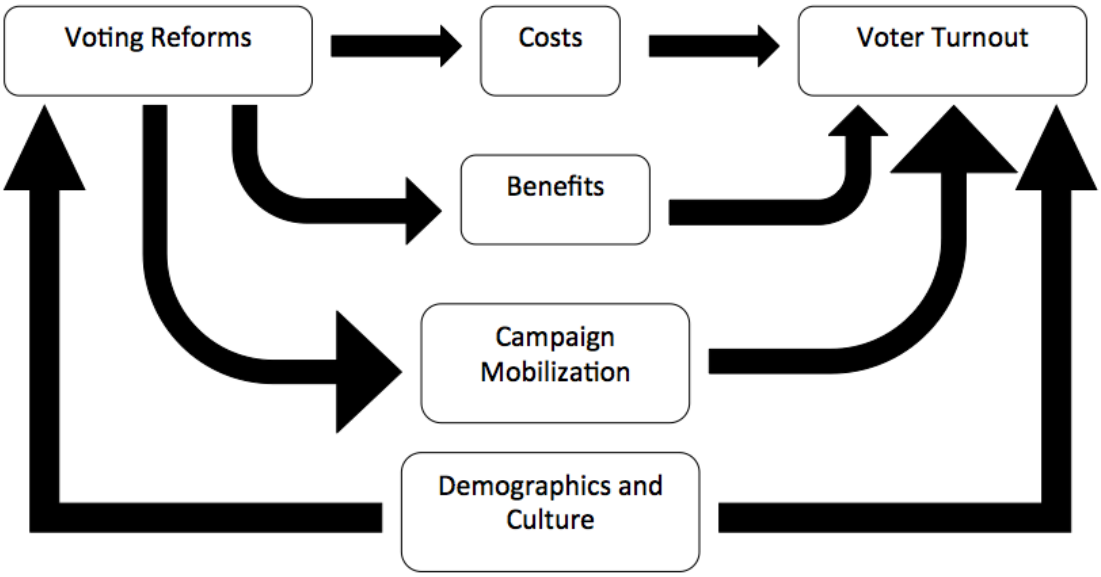
Figure 1b: Pathway Actually Tested



In line with the second possible reason listed above for why we see mixed effects, there are several pathways by which voting reforms may affect voter turnout that do not run through voting costs. Figure 1c shows these alternative pathways. The first is the effect voting reforms have on the benefits of voting. In particular, voting reforms may decrease the ability of voters to see others voting and to be seen voting by others. Early voting and EDVCs reduce the likelihood that voters run into their neighbors at the polling place due to the multiple voting locations and their large, centralized nature. This reduces the ability for neighbors to monitor voting and comment on who is being a "good citizen" and who is not—comparable to their monitoring and perceptions of who recycles (Gerber et al. 2015). Mail-assisted voting, and particularly universal VBM, makes social monitoring almost impossible. For voters who are motivated by others' perceptions of their behavior and for those who enjoy the social nature of Election Day, voting reforms can reduce or eliminate the social benefits of voting. Since these benefits

are weighed against the costs of voting, this may result in lower voter turnout even if the voting costs decrease as well.

Figure 1c: All Pathways Connecting Voting Reforms to Turnout



Another alternative pathway connecting voting reforms to voter turnout runs through the effect voting reforms have on campaign mobilization strategies. Early voting and EDVCs extend the mobilization period for campaigns that are trying to bring voters to the polls, stretching their resources and making neighborhood-based targeting more difficult (Burden et al. 2014). Mail-assisted voting makes mobilization efforts even harder because campaigns cannot transport voters to the polls and prevents them from knowing which voters are worth targeting, since many may have completed their ballots prior to Election Day. Since being asked to participate and face-to-face contact have large effects on voter turnout (Rosenstone & Hansen 1993; Gerber & Green 2000), by reducing the ability of campaigns to mobilize, voting reforms may decrease voter turnout even while decreasing costs (Burden et al. 2014).

Finally, it is possible there are factors that influence both states' levels of voter turnout and the adoption of voting reforms. For instance, states that currently have Republican governments and see minority groups growing as a percentage of the population might enact strict voter ID policies to reduce minority turnout since these groups usually vote Democratic. There may also be some factors about the civic culture of states like Oregon that lead to both high levels of voter turnout and the early adoption of reforms like universal vote by mail. Since these demographic and cultural factors would affect both the adoption of laws and turnout levels, they present confounding variables if this graph is seen as a directed acyclic graph (Morgan & Winship 2007). To the extent these factors that affect both turnout and reform adoption are present, any estimates of the effects of policies on turnout will be biased in an unknown direction.

It would be very difficult to design a study that tested the impact of all of these pathways connecting voting reforms to voter turnout. This would require extensive information about voting costs, perceived benefits of voting, and campaign mobilization tactics and utilization, as well as how much each of these is affected by a particular policy. This is beyond the scope of any one study, but progress can be made toward this larger picture. The first main contribution of this project is to illuminate the costs of voting and identify how these costs can be measured. The second is to show how these costs affect the probability of voting and which costs have the largest impacts on voter turnout. Understanding what the costs are and how to best measure them is an important prerequisite for seeing how much the costs of voting are affected by voting reforms. Revealing how much these costs affect the probability of voting can then generate predictions for how much the impact of these reforms affecting costs should be. When matched with information on how much particular voting reforms affect costs, the effects of these costs can reveal how much voting reforms affect turnout specifically through this pathway. These are the first steps to understanding the larger picture of how voting reforms are connected to voter turnout.

III. Literature Review: How have Costs been Measured?

The first goal of this project is to present a new conceptualization of costs. In order to explain why this is necessary, I must first demonstrate how scholars have conceived of costs in past studies and why previous work has been insufficient. I will begin with one way in which measures that are not actually costs of voting have been presented as viable proxies for these costs: socio-economic status (SES) variables.

III. i. The Resource Model and SES

In the literature on who participates in civic society, Verba and Nie (1972) developed the resource model of participation to explain why high-SES people participate in politics at higher rates than others. In the resource model, which was more fully developed in Brady, Schlozman, and Verba (1995) and related articles, SES provides people with the resources they need in order to pay the costs of participation. For example, high-SES provides more free time, thus making it easier for high-SES people to bear the cost of finding time to vote. Since they can more easily bear this and other costs like transportation, high-SES people turn out to vote more often than others.

As the SES model developed into its own theory of voter turnout, it became more detached from the rational framework of voting and the concept of costs. Instead of investigating the mechanisms for how the SES characteristics affected the voting calculus, these scholars simply treated the mechanism as a "black box." Many studies connected social network status, education, and economic placement to participation, but did not examine in detail the reasons for why this relationship existed (for examples, see Verba & Nie 1972; Acock & Scott 1980; Leighley 1990). Although these studies proposed that SES affects civic orientations and available resources, there were no tests between these explanations for the strong relationship between SES and voting. The closest test present in this literature is Verba and Nie's (1972) comparison of the correlation between SES and participation when civic orientations are excluded vs. when they are controlled for.

Although this is a weak test, it presented evidence that civic orientations mediate much of the relationship between SES and voting.

However, the dominant explanation for the SES model is that socio-economic status predicts the level of resources that individuals possess, such as free time, money, or civic skills (Brady, Verba, & Schlozman 1995). These resources form the budget that allows people to pay the costs associated with political participation, and different acts of participation carry different types of costs. The resource model built off both the rational choice and the SES models by pointing out that differing levels of resources give individuals different abilities to pay the costs of voting.

Although the resource model has a convincing logic that allows it to fit into the rational choice model's framework, it is subject to some confounding variables that I believe detract from Brady et al.'s findings. The authors use family income as a proxy variable for available money, but this is highly correlated, if not synonymous, with SES (Cho 1999). They also use educational attainment as a proxy for civic skills, which is also highly correlated with SES (Cho 1999). Since the resource variables are strongly affected by SES, it is not clear whether a correlation between them and turnout is due to resources themselves or comes from other variables affected by SES that influence participation. There are multiple plausible pathways by which SES can affect participation other than through resources—such as socialization of political interest and civic duty, social pressure to be seen as a voter, and differential mobilization to various SES groups.

One of these possible pathways is that placement in particular social groups from SES factors might lead individuals to possess different degrees of a sense of civic duty and interest in politics. If wealthier and more educated people hold stronger norms of participation, these norms are then transmitted to others in their social networks (Abrams et al. 2010; Gerber & Rogers 2009; McClurg 2003; Verba, Schlozman, & Brady 2000; Kenny 1992). The social pressure from ones' peers can have a large effect on participation, and this pressure can be seen as the "external part" of civic duty (Gerber, Green, & Larimer 2008). This story presents a very

different way of connecting SES to the rational utility model than the resource model of Brady et al. (1995)—one that runs through the "benefits" side of the rational voter's turnout equation.

Another pathway that could connect the SES model to the rational choice model of participation runs through childhood socialization. Since socio-economic status is passed down between generations, individuals with high SES were likely raised in households with high SES. If higher-SES parents were more likely to socialize their children into the habit of voting, then this would lead to higher "internal portions" of civic duty—the psychological satisfaction that comes from contributing to the long-term benefit of voting to society (Westholm 1999; Knack 1992). Being exposed to parents who are politically engaged can also lead to higher levels of political interest in children (Knack 1992; Bennett & Bennett 1989; Chaffee, McLeod, & Wackman 1973). This socialization can also come through the generally better educational opportunities available to higher-SES individuals. Although this theory is very similar to the network effects from peers, it carries a slightly different implication regarding when the SES is important. Under this theory, SES as a child would predict participation better than SES as an adult.

There is a third alternative pathway linking SES to participation which comes from the differential exposure to mobilization that happens to individuals based on their placement in a neighborhood and social network. Individuals in areas with more high-propensity voters are more likely to be targeted by mobilization appeals (Rosenstone & Hansen 1993; Huckfeldt & Sprague 1992), and since high-SES individuals tend to vote more, high-SES neighborhoods should receive more mobilization messages. Since mobilization is connected to higher turnout (Gerber & Green 2000; Arceneaux & Nickerson 2009; etc.), this increased campaign contact in high-SES areas could be driving the relationship between SES and turnout. Furthermore, mobilization in these neighborhoods can lead to more peer-to-peer mobilization from neighbors talking about politics and signaling norms of participation in the neighborhood.

To my understanding, none of these alternative mechanisms connecting SES to participation have been directly tested, and they have certainly never been compared to the resource model of Brady et al. One of the goals of this project is to demonstrate that SES factors are distinct from the costs of voting. If SES factors do not have a strong relationship with the costs of voting, then the impact of these factors on voter turnout is mostly attributable to the benefits of voting. I test for these connections in Chapter 3 to explore this possibility.

A better conceptualization of the costs of voting, which I will present in subsection IV of this chapter, begins by moving away from the resources model and the notion of "ability to bear costs." Although SES may be related to voting costs, this connection would come through its effects on the trade-offs people must pay to perform the tasks of voting. While the resources theory says that the costs themselves are mostly static and people vary in their ability to pay them, I argue that the costs themselves vary based on individual characteristics. Since these characteristics (which I detail in subsection IV) vary by life circumstances and the voters' environment, SES factors are likely poor proxies for these costs.

III. ii. Studies Measuring Specific Costs

In a separate line of literature from the SES studies, scholars have examined the impact of specific voting costs on the probability of voting. Instead of using survey-measured proxy factors like SES or different resources like free time, these studies usually employ "unobtrusive" measurements to examine variation in a particular cost of voting. For example, studies looking at the effect of the cost of traveling to the polls have used the distance between the voter and his polling place to see how living farther away deters voting by making transportation more difficult. Instead of asking voters this distance directly, researchers calculate it from GIS software and information from a voter file. Similarly, they use a voter file to observe validated voting behavior and combine this information to model how distance affects the probability of voting.

Most of the studies looking at specific voting costs have focused on the cost of traveling to the polls since this is the most easily observable cost with considerable individual-level variation. Using the technique described above, scholars have found that longer distances reduce the likelihood of voting (Haspel & Knotts 2005; McNulty 2011; etc.). The effect of distance is mediated by impedance, which represents the difficulty of the route from the voter's house to the polls due to traffic, intersections, etc. (Gimpel & Schuknecht 2003). Some researchers have also used GIS to connect voter file information to aggregated U.S. Census information on voters' characteristics. For example, this allowed Haspel & Knotts (2005) to see how neighborhood-level average vehicle access mediates the effect of distance.

In addition to examining how distance affects voter turnout by affecting travel costs, scholars have also used "natural experiments" to show how turnout declines when traveling becomes more difficult. In these studies, researchers used the presence of rain on Election Day, which varies randomly due to natural factors, to proxy for how rain makes traveling to the polls more difficult. Most people do not like walking in the rain, and many do not like driving in the rain and may avoid it for safety reasons. As a result, rain makes the travel cost of voting higher, and turnout drops (Persson et al., 2014; Fraga & Hersh, 2010; Gomez et al., 2007).

Scholars have also used the natural experiments of precinct consolidation and re-drawing of precincts to examine the cost of finding the polling place. In a traditional precinct voting system, voters have to know which voting location is specifically assigned to their neighborhood. Since many voters know this location from past voting, scholars have looked at the change in turnout when voting locations change while the voter has not moved. They found that even after controlling for distance changes, voter turnout goes down upon precinct changes due to the information search cost required to find the new polling place (Brady & McNulty 2011; McNulty, Dowling, & Ariotti 2009; Haspel & Knotts 2005; Dyck & Gimpel 2005).

Only one study on the specific costs of voting went beyond unobtrusive measurements to include survey information relevant to these costs. Bhatti (2012) used survey information on vehicle access and was able to connect this information to voter files due to the unique individual-level survey data availability in Denmark. This technique revealed that the cost of traveling to the polls has a larger impact on those without vehicle access, and this cost goes up as distance increases.

In general, studies on the costs of voting have rarely used survey data. This is largely due to the difficulty of connecting survey information to validated voter turnout information. There is one article that uses survey information on students' social opportunities they must forgo to vote, but it only uses hypothetical vote intention since connecting this information to observed voting was not possible (Goerres & Rabuz 2014). One goal of this project is to use individual-level information that is only available in surveys to measure costs more accurately than previous studies have done. This dissertation project is the first to collect information on a large number of cost factors and areas and connect them to verified voter turnout information, and the first to connect individual-level costs measured through surveys to verified voter turnout in the United States context.

IV. A New Theory of Costs

In the rational model of voting, the act of voting carries various costs that must be paid in order to cast a ballot. In deciding whether to turn out to vote, potential voters weigh their perceived benefits of voting against these costs and will vote if the expected benefits outweigh the costs. Scholars have recognized that these benefits vary by individual based on several factors, including a voter's perceived value of her vote's instrumentality (Aldrich 1993), her expected social benefits or sanctions (Gerber, Green, & Larimer 2008), and her perceptions of the value of voting as a civic duty (Riker & Ordeshook 1968). While the literature shows that these benefits of voting vary by both individual characteristics and larger contextual factors, it has not generally treated costs in the same way. Instead, institutional-level voting reform policies have been presented as proxies for costs,

such as the presence of strict voter ID requirements (Nielson 2014), registration prior to Election Day (Leighley & Nagler 2013), or the presence of multiple days or methods of voting (Gerber et al. 2014; Stein & Vonnahme 2008). Even when researchers have considered costs at the individual-level, such as the distance between a voter and her polling place, they have treated distance (or distance interacted with impedance) as the same cost for all voters, regardless of vehicle access or other factors. Only one study in a European context actually included individual-level data on vehicle access, and no studies have examined how the other costs of voting are similarly influenced by individual characteristics.

In order to be consistent with the rational utility model, costs as well as benefits must be seen as changes in utility that accompany the act of voting. Since considering the economic utility of an action in the rational model is a concept that only exists hypothetically inside of peoples' minds, the gains and losses in utility from an action cannot be measured directly and objectively. They are inherently subjective perceptions of people, and different people will consider the same cost factor in different ways. Costs or gains may be measureable in terms of tangible concepts like "spending an hour of time," analogous to the money a child must spend to buy a toy. However, the gain in utility that is associated with the child's purchase cannot be measured directly, as it exists solely as enjoyment in the mind of the child. For instance, this toy may bring intense happiness to a particular boy for a week, but for his sister the toy might be ignored altogether. In the same way, the loss of utility from spending the money on the toy cannot easily be quantified because it only exists as a set of trade-offs that the child internally considers about what else he could buy with that money. If the boy has twice as much weekly allowance money as his sister, the trade-offs he must make to buy the toy should seem smaller and less salient for him than they seem for her. Although this analogy may seem odd when looking at the costs of voting, it demonstrates how the costs of performing actions vary based on individual circumstances like resources and perceived trade-offs. I argue that voting is similar in that an outside observer cannot objectively

measure the benefits and the costs without accounting for the voter's perceptions of them.

The benefits of voting in the rational utility model are generally considered to be the voter's utility gain from her preferred candidate winning the election. In entering the utility model, these utility benefits are mediated by the probability that the voter's ballot is the decisive vote that determines the outcome of the election. How can we measure this utility? For individual issues, like tax policy, we may be able to calculate the difference in expected utility between one candidate's policies and the other's (e.g., the income difference from paying more taxes under one set of policies). However, this calculation becomes much more difficult, if not impossible, when multiple policies are considered in conjunction. How does the gain in utility from lower taxes weigh against the loss of utility from neglecting infrastructure maintenance? What if we add changes in liberties like gun control into the equation? How do we calculate one's change in utility from surrendering a gun, much less combine it with other issues to identify their overall utility from one candidate winning? Since policy platforms include many issues for which it is difficult to measure their utility, it is essentially impossible to calculate a person's benefits of voting from objective measures of policies. The only way to observe this change in utility would be to ask the voter directly and record their perceived overall benefits.

In the same way that the totality of benefits from a voter's preferred candidate winning cannot be converted into dollar amounts, the costs of voting cannot be measured directly from objective factors like distance to the polls or time spent voting. These factors certainly influence the voter's perceived costs, but they are not the costs themselves. In my re-conceptualization of costs, these factors form the first dimension of voting costs. This dimension consists of the tasks that must be performed in order to vote, which are determined by the voter's environment. The environmental factors that shape the tasks dimension include the voter's geographic setting, including urbanization and transportation access, and her institutional setting, which is composed of various voting and registration laws. For example, a

voter who must register one month before Election Day faces a more difficult transaction task he must perform than a voter in another state that allows registration on the same day as voting. As another example, a voter who must wait in line for two hours faces a harder waiting task than one who can walk in and vote right away. Regardless of the voter's characteristics, each of these tasks can be objectively ranked as more or less difficult by an outside observer. The tasks dimension has received the vast majority of the attention in the literature on the costs of voting, but it is usually treated as the costs themselves instead of just one dimension that shapes individual-level costs.

The second dimension of the costs of voting is composed of the individual's trade-offs (also known as opportunity costs) that she must forgo in order to perform the tasks of voting. These trade-offs are determined by the voter's individual life choices like marital status and having children, by uncontrollable personal factors like age or disability, and by other circumstances like vehicle access or public transportation availability. Consider the task of registering to vote one month before Election Day. This can be an onerous task for people without internet access or knowledge of their election office, since they must engage in a difficult information search to find out how to register. This same task could be relatively easy for someone with knowledge of how to contact their local election official or who has the internet access and skills that enable him to find the information. As another example, traveling a mile to the polls is relatively easy for a voter with a car, costing only a few minutes, a small amount of gas, and other almost negligible costs. However, the trade-offs needed to travel a mile for a disabled, elderly voter without a vehicle are much higher and may involve paying for a taxi or relying on the goodwill of others to transport them.

As they enter the economic utility calculation of the rational utility model, the costs of voting are created from a combination of both the task dimension and the trade-off dimension. For example, distance from a voter to the polling place has no direct impact on whether one votes by itself, but it does have an impact when considered in combination with a voter's available transportation options.

Similarly, waiting in line has no impact on its own, but it does influence voting when a person's activities they must sacrifice in order to stand in line are considered. For an hourly worker, the trade-off may involve sacrificing a couple hours' worth of pay in order to wait in line. For a stay-at-home mother, the trade-off may involve finding a babysitter for her children. For a retired person, however, the trade-off for waiting may be negligible since he is not sacrificing pay and does not require childcare services.

Of course, if these task dimension factors are measured as proxies of individual voting costs, they will likely show a relationship with the level of voter turnout across a population. However, this aggregate-level relationship is hiding the real variation in trade-offs that people within the electorate face in order to perform the tasks of voting. Looking at costs as the combination of tasks and trade-offs creates a much clearer measure of the loss in utility that accompanies voting, providing researchers with a clear conception of costs with which they can measure both costs themselves and the costs' effects on the peoples' likelihood of voting.

V. The Tasks of Voting

The various costs of voting can be grouped together into four main tasks that a potential voter must complete in order to vote. Each of these tasks can be seen as independent and separable from the others, and in most states a voter must complete all of them in order to successfully cast a ballot. Each task is a necessary, but not sufficient, condition for voting. These tasks are registering to vote, finding time to vote, locating the polling place, and traveling to the polls.

V. i. Registering to Vote

In the United States, the first task that a voter must complete is registration. The process of registering to vote differs by state, where some states allow internet-based registration and others only allow mailed applications. States also differ in terms of when voters can register to vote, with some allowing Election Day registration while others have deadlines weeks ahead of Election Day. As discussed

in the literature, the task of registering to vote mostly requires information. A voter must know, first of all, that she must register first to be eligible to vote. This requires a minimal but not universally present knowledge of the political system in the U.S. Secondly, the voter must know where to obtain the registration application, when the deadline for submitting the application is, and how to submit the application to the relevant office. While most potential voters are probably aware of the need to register, many of them are probably less informed about their states' process for registering. One could then see the task of registering to vote as composed of two sub-tasks: obtaining the relevant information regarding how to register, and then obtaining, filling out, and submitting the application.

The first sub-task of registering, that is, obtaining the necessary information on the application process, has been the focus of most of the literature on the cost of registering to vote. Often, studies such as Timpone (1998) have used education or a measured scale of political information as a proxy variable for having this specific bureaucratic information. This makes sense because highly politically informed and highly educated people are more likely to know where to find this information and how to obtain it. The highly politically informed are probably already aware of this process, having likely registered in the past already. Someone who is highly educated but not politically savvy may not know where to find the information, but his education gives him resources (like experience with bureaucracy) that make the task easier for him (Brady et al. 1995).

Of course, registering also requires the sub-task of submitting the application as well, which in the past was considerably more difficult (Highton 2004; Rosenstone & Hansen 1993). After the adoption of HAVA, many voters now register through the "motor-voter" process at their local DMV or through online internet-based registration systems. Motor-voter registration laws come "close to eliminating registration as a separate activity with its own costs" (Teixeira 1992) since they allow for people to register without any planning or a separate trip to a government agency. Still, when voters move addresses or their registrations expire, they often have to register at a time when they do not need to access the DMV. In 12

states, the only way to do so is either in-person at a government agency or by sending a mailed voter registration application that must be received by several weeks before Election Day. In these states, registering outside of a DMV requires the substantial tasks of printing out, filling out, and mailing a form or of driving to a government agency during work hours. Thirty-eight other states allow online registration, but this still requires filling out an online form several weeks prior to the election. In 13 other states, this task can be performed on Election Day or early voting days at voting centers, effectively eliminating this task and its costs entirely.

V. ii. Finding Time to Vote

For potential voters who have completed their prerequisite registration tasks, the next cost of voting they must fulfill is finding time to vote. By "finding time to vote," I mean identifying a period of time in which the other tasks of voting may be performed and preventing scheduling conflicts with this period of time. For example, a single mother who works during the day might need to take off an hour from work to travel to her polling place and vote before picking up her child from daycare. Regardless of when, where, and how a voter casts her ballot, the task of identifying a period of time in which to perform the other tasks of voting must be completed. For a voter fortunate enough to live in one of the three states with universal vote by mail systems, this task can be relatively easy because it can involve any time when the voter is at home. She can simply fill out her ballot during any free time at home and place it in her mailbox to cast her ballot. This makes identifying a time to vote easy since free time at home is relatively abundant and the voter can stop and re-start the process at any point. The flexibility of when she fills out her ballot allows for her pick from many different times to find the one with the lowest trade-offs and therefore the lowest costs.

With the exception of absentee voters, those in the 47 other states must identify a time in which they can travel to the polls, wait in line, and cast their ballots in voting booths. For voters in the 34 states that allow early voting, finding this time is easier than in states with only Election Day voting since these voters can

choose from a variety of days in which to identify their time to vote. A voter in an early voting state like Texas who works on weekdays can choose to vote on a Saturday or Sunday instead, or can plan to stop by the polls after work on any day of the two weeks leading up to Election Day. By contrast, a voter in a state like Pennsylvania, which only allows Election Day voting, must find a chunk of time on one particular day in which he can cast his ballot. This makes the task of finding time more difficult because of the lack of flexibility over when the voter must set aside this time.

There is also a search cost surrounding finding time to vote, in that voters must be aware of which times they can legally ballot. Although early voting provides flexibility in voting times, it also carries a higher search cost since voters must access the Internet or another resource to identify when they can ballot. On the other hand, this cost is essentially eliminated for VBM states since voters are unconstrained on when they fill out their ballots. Even for voters who drop off mailed ballots in-person, counties often provide 24-hour drop-boxes that allow them to submit their ballots at any time.

V. iii. Locating the Voting Place

Citizens who want to vote need to know where they must go in order to cast their ballots. For everyone except for mail-assisted voters, this involves identifying a physical location they must travel to in order to vote. Voters who use absentee ballots or who live in universal VBM states do not have to find this location because they can simply mail their ballots to the county using the instructions included with their ballots.

Voters in most states, and those who did not or could not request an absentee ballot, must travel to a polling location during a time when the polls are open in order to cast a ballot. In most in-person voting systems, often called "traditional precinct voting," voters are assigned a single location, often close to their homes, at which they can vote. For any voter who has not used their neighborhood precinct location before, for those who do not remember where they

voted previously, or for voters whose precinct location changed, they must find out where their particular precinct is assigned to vote. This information is publically available on the Internet and by contacting the election officials' offices, but voters must be aware of these resources and know how to access this information. For voters who have been in the same precinct over many elections, this location often stays constant, eliminating the "search cost" of identifying where to vote. The cost of locating the polling place can be substantial enough to decrease turnout when precinct locations change due to consolidation or splitting of precincts (Brady & McNulty 2004; Haspel & Knotts 2005).

Even in systems with multiple centralized locations voters can choose from, like early voting and EDVCs, voters still have to know what their options are and figure out the location most convenient for them. Since these locations may change over time and are not as proximate to the voter, EDVCs require a search cost that may be higher than for precinct voting. Potential voters have to access a website or some other information source that informs them about which locations are available to vote at.

V. iv. Traveling to the Polls

Those potential voters who successfully identified and set aside a time to vote must also identify where they need to go to vote and physically travel there, which presents another area of voting costs.

For voters in universal VBM states, transportation cost is essentially eliminated since the voting location is the voter's home or wherever else he chooses to fill out his ballot. Although most VBM systems provide a location for in-person ballot return, voters have the option to just put a stamp on the ballot and mail it back. Voters under VBM systems would face this cost only if they decide to return their ballots in person rather than mail them back. Voters in states with no-excuse absentee policies or permanent absentee lists can also mail their ballots back to avoid travelling to the polls. However, these voters must request an absentee ballot

first (or sign up for a permanent absentee status), which requires planning ahead of time to register for this ballot.

While traditional voting precinct locations are chosen to be close to where voters live, this distance can still provide a substantial obstacle. Due to their low population density, rural areas often have large distances between voters and their assigned locations. Urban areas can also face accessibility difficulties from traffic, lack of parking, and impediments to straight-line travel like freeways that can only be crossed at certain locations. While precinct voting locations are usually assigned due to their proximity to voters' homes, this is not always the most convenient location for the voter. For example, a voter who works long shifts during the day might not be near her home except for early in the morning or late at night, necessitating travelling from her workplace during a lunch break.

Some jurisdictions have moved toward another model of polling places that relies on employing a number of easily accessible, well-staffed large locations. These locations, known as Election Day Vote Centers (EDVCs), allow voters to ballot at any of the EDVCs in their county rather than one assigned location. They are typically designed to be convenient by their proximity to workplaces, shopping centers, and areas of dense population (Stein & Vonnahme 2008). While these locations afford the voter more flexibility in terms of where she can vote, they are usually further from voters' homes than traditional precinct locations and almost always require some form of vehicular transportation to access.

VI. Factors Influencing the Difficulty of Voting Tasks

For the individual voter, each of the tasks of voting present costs that she must "pay" in order to cast a ballot. Of course, these costs are not directly paid in the form of monetary transfers or anything similar. Rather, the costs that the voter faces are the trade-offs she must make in order to perform these tasks. The relevant question to the potential voter is, "what must I sacrifice in order to perform this task?" This is a question we are all familiar with, as we make sacrifices with every decision we make throughout any given day. For example, an hour spent cooking

dinner is an hour that could have been spent watching TV and ordering delivery instead. How a voter perceives the costs of voting is inherently shaped by his perceptions of what he must "trade" to perform the tasks to vote. The following subsections detail the factors that shape these trade-offs.

VI. i. Experience

Experience with the voting process primarily affects the information component of the tasks, sometimes called the "search cost" or "information cost." For example, citizens who have previously registered to vote at another address will likely find it easier to register again since they are aware of the requirement and know how to submit an application. Even people who move from another state with a different registration process will face an easier task in registering since they are at least aware of the requirement well in advance of the election.

Experience reduces information costs by providing two tools to potential voters: expectations and knowledge. An example of experience providing expectations is that people who were registered, but move and need to re-register, are aware of the need to register again before they can vote. They also have some expectation of the registration due date, or at least that it is several weeks before Election Day. Experience also provides knowledge to voters that reduces search costs because they do not need to find all the information. For example, a voter who has previously submitted a mailed registration application might remember this process and how to obtain and submit the application, which means she doesn't have to search for this information.

The determinants of experience are generally the number of voting experiences and the applicability of these experiences. Voting once previously in the same precinct may be more valuable than previously voting twice in another precinct or in different types of elections.

Experience helps reduce the information cost of finding time to vote by providing expectations about the amount of time needed to vote. While new voters might rely on media estimates or peers' accounts of their wait times, those who have

voted many times before have past experiences to generate their expectations from. This is especially true for voters who have remained at the same residence for many election cycles since the experiences at different polling places will vary more than at the same location over several comparable elections.

Experience is particularly useful for the tasks of locating and traveling to the polling place for voters who have stayed at the same residence. Since election officials usually keep the same polling locations for precincts over time, habitual voters do not need to engage in an information search to find out where to vote. On a more detailed level, they may also remember the best way to get there, including which bus route to take or where to park.

Within the framework of tasks and trade-offs, one mechanism by which experience affects the difficulty of tasks is by eliminating the smaller "sub-tasks" associated with information searches. If a potential voter does not have to search to find out how to register to vote or where her polling location is, her costs of registering and traveling to the polls are lower because these sub-tasks are eliminated. Experience can also affect the difficulty of tasks by enabling the voter to make more accurate predictions regarding expected travel times, wait times, and overall difficulty of tasks. If a voter can predict with a high degree of certainty that traveling to the polls and waiting in line will only take 45 minutes, she does not have to allocate as much time to vote as a voter who is less certain. This reduces the expected difficulty of these tasks, which affects behavior since the "true" difficulty is unknown until the task is completed. Even if a voter with less experience who planned to take 2 hours would only actually need 45 minutes, she still perceived the costs of voting to be higher based on her prediction of 2 hours and may be less likely to vote as a result.

VI. ii. Employment Situation

A person's employment situation consists of his employment status (employed vs. un-employed or retired) as well as the characteristics of his job, including how many hours he works and when, whether he receives paid time off

work, and the flexibility of his schedule. Out of these factors, being currently employed is the easiest to measure and is the dividing factor that probably makes the largest difference in shaping the difficulty of the voting tasks. The characteristics of the job then shape the trade-offs that the person faces when deciding whether to vote. However, these characteristics are likely to affect the difficulty of these tasks in a combinatory manner rather than individually. For example, a potential voter who works only 10 hours per week might still find this is a barrier to voting if these 10 hours fall on Election Day, his schedule is inflexible, and he receives no paid time off work.

The method by which the employment situation affects costs is by shaping the trade-offs associated with the task of finding time to vote. Voters who are unemployed or retired still must complete the same tasks as those who work, but they will face fewer sacrifices they must make to complete these tasks. A full-time employee at a desk job who receives paid vacation and has a flexible schedule faces sacrificing a few hours of vacation time to cast her ballot. This is a larger trade-off than a retired person faces to vote, but it is also substantially less than the trade-off faced by someone who receives no paid vacation and has a less flexible schedule, such as an employee in the service industry. If an employee at a fast food restaurant is scheduled to work on Election Day, she may find it very difficult, if not impossible, to take time off for voting. This employee would likely have to sacrifice several hours of pay if the shift could not be re-scheduled, assuming that her boss would let her take this time off. Some employees with very inflexible schedules would face the very large trade-off of getting fired for leaving their shift without permission.

The first determinant of the relevance of a person's employment situation to these trade-offs is whether a person is scheduled to work on Election Day (or in early voting states, during the times of early voting). This is most applicable if the person is supposed to work during all of the voting hours, or at least a substantial majority of them. Employees who work busy schedules on other days or who do not work might have to sacrifice their leisure time to vote, but they would not face the same employment trade-offs.

Assuming the employee has to work during most of the voting hours, the next determinant of employment trade-offs is the flexibility of the employee's schedule. At the extreme, an inflexible schedule could require the loss of one's job to vote. If the schedule is flexible enough to permit the employee to leave work, then the factor of lost income becomes important. If the employee can receive time off work relatively easily, then whether or not she receives paid vacation or can re-schedule her shift determines whether the employee faces a monetary cost of lost income from taking this time to go vote.

VI. iii. Educational Situation

A potential voter's educational situation is defined as whether she is currently attending school and whether she has scheduled classes during voting hours. Like her employment situation, this area of trade-offs primarily affects the cost associated with the task of finding time to vote.

The main determinant of how one's education affects the trade-offs associated with finding time to vote is having classes or labs during voting hours. If a student has classes during most of the time that polls are open, then the flexibility of this time becomes relevant. Students in large lecture hall classes where the instructor does not take attendance have more flexibility to miss these classes than those who have required labs or small classes with discussion points. Although other factors like homework could be considered potentially relevant, this work is generally flexible and therefore only represents trade-offs with leisure activities. The trade-offs associated with missing class can range from the minimal cost of getting notes from a peer for a class with no attendance policy to the maximum cost of failing a class due to missing a required lab or exam.

VI. iv. Living Situation

Peoples' living situation includes many different factors, but the one most relevant to the trade-offs associated with voting tasks is whether a voter is a caretaker for one or more dependents. People who are not employed and not attending school still face a number of responsibilities they must fulfill on a daily

basis, including preparing and providing food and other various types of housework tasks. For those with dependents such as children, the physically or mentally impaired, or elderly relatives, these tasks also include caretaking. While most tasks of self- and home-maintenance like preparing food are flexible in when they are performed, caretaking is often a 24-hour constant responsibility. For example, young children cannot be left at home alone for any amount of time, and elderly adults with Alzheimer's also cannot be left unattended.

The living situation (or caretaker status) primarily affects the trade-offs associated with finding time to vote, although it can also affect the trade-offs attendant to traveling to the polls. Children can sometimes accompany adults to vote and would not be prevented from entering the polling booth with their parents, so a stay-at-home mother may be able to watch them at the same time as she casts her ballot. However, bringing a child still adds to the overall difficulty of the task by making it more stressful, creating a trade-off between a quiet day at home vs. risking one's toddler having a meltdown in public. Bringing a child to vote also creates more trade-offs for traveling to the polls by requiring a safe form of transportation for the child as well as the parent.

In many cases, being a caretaker requires a potential voter to locate and provide an alternative caretaker for the time he needs to go vote. In many cases, such as with an elderly parent, the dependent person cannot accompany the voter to the polling place and into the voting booth. In situations like these, a voter must have a friend, relative, or paid caretaker watch the dependent while they travel to the polls and vote. Imposing on others to help out or the process or locating a babysitter or caretaker can impose a substantial amount of stress, which creates a trade-off compared to staying at home with little stress. In the cases of paid help, this can also impose a monetary burden on the primary caretaker.

VI. v. Transportation Access

A voter's access to transportation affects the trade-offs associated with traveling to the polls. Voters who have a vehicle available and can drive themselves

to the polls generally face smaller trade-offs to travel than those who do not. The former group can drive themselves to the polls, paying only the cost of the time needed to travel and the small cost of the gasoline and vehicle maintenance for the miles they drive. For this group, the primary factor shaping the trade-offs with getting to the polls is travel time, which is a function of both distance to the polls and impedance (difficulty of the route due to traffic, intersections, etc.).

The latter group must figure out other ways to get to the voting place, including walking, biking, public transportation, taxis and ride-sharing apps, or getting a ride with someone. For them, the trade-offs will be larger as the number of options and the convenience of these options decreases. Voters who have a bus stop on the corner that takes them right to the polling place face only small trade-offs of the time and bus fare to travel. Similarly, voters who can use Uber or Lyft can simply call a ride and only trade-off the time to travel and the cost of the ride.

Registered voters without accessible public transportation and who do not use or have access to ride-sharing apps might be left with only walking to the polls. The trade-offs associated with walking or biking are shaped by the distance the voter is to the polls as well as by the person's physical condition. A competitive runner would have no problem traveling a few miles on foot to vote, but a disabled person who uses a wheelchair would likely find it extraordinarily difficult to travel there without a vehicle.

VII. Conclusion

Previous literature on the costs of voting has either relied on SES variables as proxies for costs per the resource model, or has looked at a few individual costs separately. I have not identified any studies that have attempted to comprehensively measure the different costs of voting and their impacts on voter turnout. One of the goals of this project is to provide an accounting of these different costs and to examine their impacts on the probability that registered voters turn out to cast ballots.

In order to fully understand the costs of voting, we must first adopt a cost-benefit rational utility framework. Since the costs and benefits both vary to each specific voter based on his or her experiences, circumstances, and personality, we must account for individual variation in costs as well as benefits. Costs enter the utility model by individuals perceiving the trade-offs they must make in order to perform the tasks needed to vote. Since costs will vary by both the tasks themselves as well as the trade-offs or opportunity costs voters must face to perform them, a proper accounting of the costs of voting will include measures of both the specific tasks (registration, finding the polls, traveling to the polls, and finding time to vote) and voters' trade-offs, which are shaped by individual-specific factors like employment and job flexibility.

In the next chapter, I detail how I created an original survey to measure perceived voting costs, the difficulty of the tasks necessary to vote, and the individual-specific trade-offs needed to perform these tasks. I also provide descriptive statistics on all the measures that I will use in the subsequent chapters.

Chapter 2: An Original Survey Measuring the Costs of Voting

I. Introduction

In order to measure all of the types of costs associated with voting, we need survey data that contains information on potential voters' tasks needed to vote (e.g. how far do they have to travel to the polls) as well as information relating to their trade-offs associated with those tasks. For example, if a potential voter has a vehicle and drivers' license, the trade-offs attendant with the task of traveling to the polling place are relatively small compared to another potential voter without vehicle access. For the person with the car, the trade-offs would include the marginal gas and maintenance cost of traveling in the vehicle, and parking costs, and the time needed to drive to the polling place. However, for the person who has no car, the distance to the polling place causes different trade-offs, including typically longer travel time, the cost of public transportation, or the physical exertion of walking to the location. We need survey information that asks about all the relevant factors that shape these trade-offs as well as the tasks.

Unfortunately, there are no publicly available surveys that contain this type of data on both the tasks and the factors affecting their associated trade-offs. Some of the tasks can be measured unobtrusively, for instance by using a voter file and geographical information systems (GIS) to calculate the distances between voters and their polling places. Similarly, past researchers have used changes in the institutional setting, such as a re-assignment of polling places, to proxy for the cost of figuring out where to vote. However, these unobtrusive measures do not include the personal information that is needed to know what the trade-offs for the voters are. Due to this lack of existing survey information, I created and fielded a unique survey measuring factors that affect both tasks and trade-offs for voting costs.

II. Creating an Original Survey

Due to the lack of available data on both of the cost dimensions, I created and fielded an original survey prior to the November 2016 general election designed to measure three of the main areas of voting costs, namely knowing where and how to vote, traveling to the polling place, and finding the time to vote. The cost of the registration task is excluded due to the research design and population of survey respondents, which I will explain further in the next subsection. To connect the survey information with verified turnout information, I sampled from a registered voter file in order to match subjects' responses with validated voting records for the 2016 general election.

II. i. Survey Design and Context

For my original survey on the costs of voting, I drew the sample of respondents by starting with the registered voter list for the state of Pennsylvania. I drew my respondents from the registered voter file for several reasons. Using the voter file provided me with some information about the respondents that I might not have been able to ask about directly, such as the person's name, age, address, gender, and party affiliation. It also allowed me to easily match respondents to their validated voting records after the election. This is a critical characteristic of these data that allows me to measure the impact of these voting costs on actual, objectively measured voter turnout. Although I cannot measure the costs of registration since I am only looking at voters who already registered, this method provided enough other advantages that this omission must be tolerated. Furthermore, thanks to reforms such as motor-voter policies, these costs are relatively minimal compared to the costs of voting itself, and increasing registration would not necessarily increase turnout (Highton 2004).

I chose to use subjects only from Pennsylvania since it is one of the only states with the combination of no early voting and no ability to vote absentee by mail without having a valid excuse. Valid excuses include traveling out of the jurisdiction on Election Day and disability, but do not include the elderly by default.

These characteristics mean that all voters are faced with relatively comparable voting tasks of traveling to the polling place on Election Day, rather than voting at their own convenience or filling out a mailed ballot at home. Using one state for the data source also made it easier to obtain the registered voter file to recruit respondents and annotated voting histories for the subjects.

II. ii. Survey Solicitation and Responses

In order to recruit the subjects, I obtained registered voter files from the state and sent postcards to voters with a message soliciting them to fill out an online survey. To encourage participation, I provided a small monetary incentive of $5 Amazon.com gift cards to those who completed the survey. Figure 2a shows the front design of the postcard, and Figure 2b shows the back of the postcard. The back includes a brief solicitation, the website URL to begin the survey, and a five-letter code that was unique to each respondent.

Figure 2a: Front of Postcard

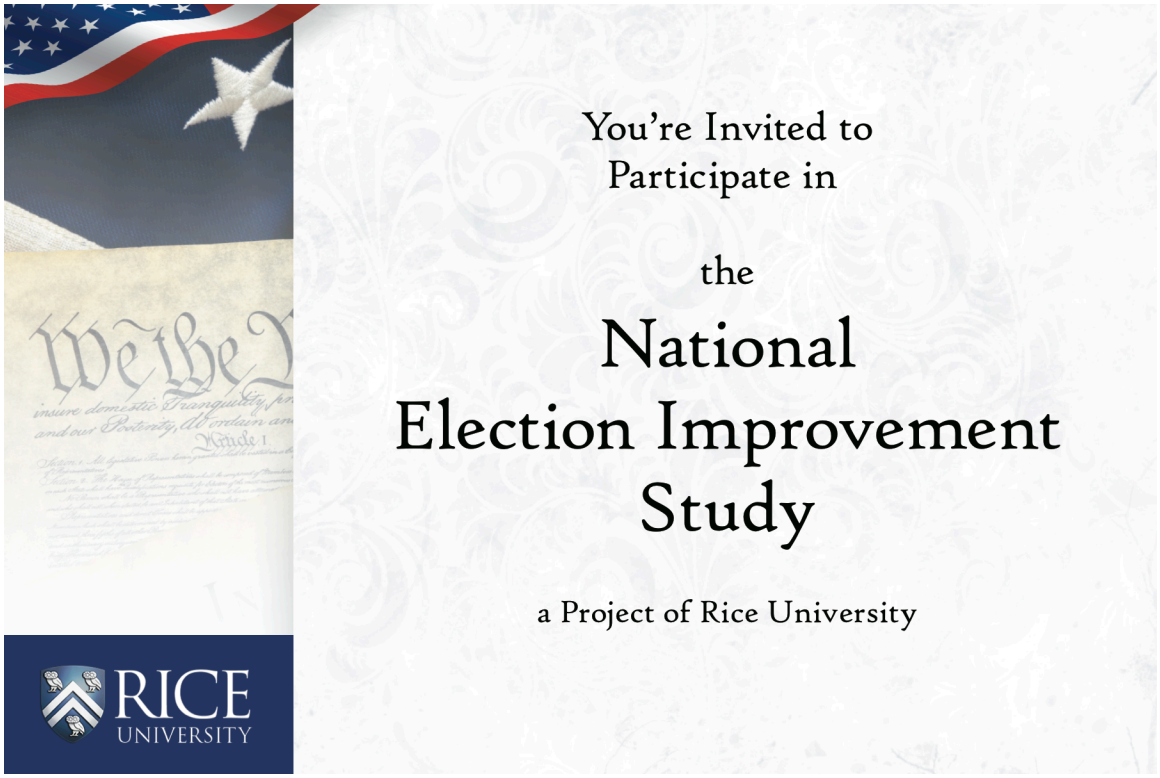
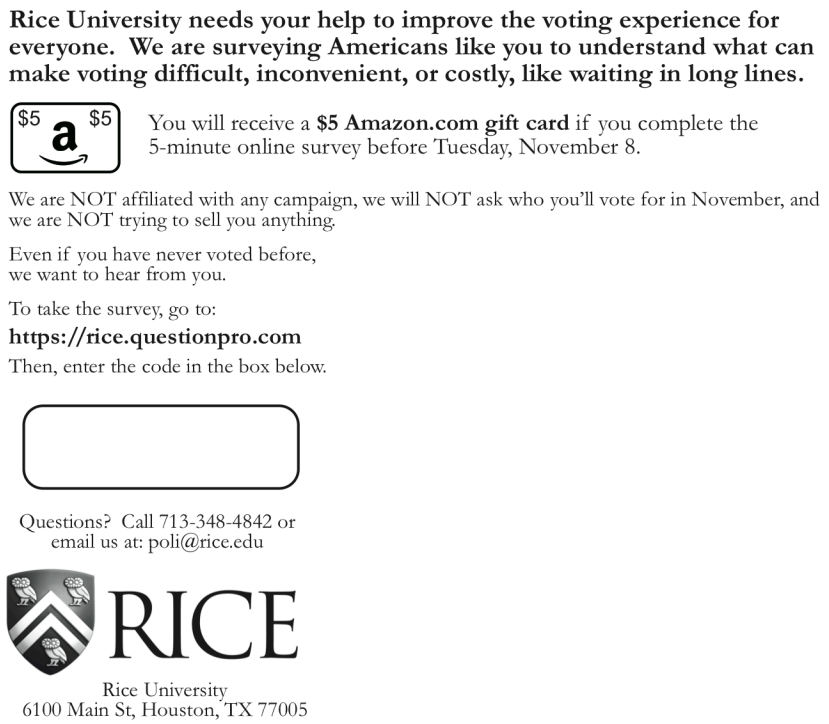


Figure 2b: Back of Postcard



In total, I randomly selected 35,000 registered voters to receive postcards with survey solicitations from the Pennsylvania voter file that I retrieved in October 2017. To ensure my sample was not composed of only frequent voters who were might underestimate the difficulties of the voting tasks, I oversampled on recently registered voters. I did this by randomly selected half (17,500) of the solicited population from voters who registered between 2015 and 2016, and the other half from voters who registered prior to 2015.

I spent considerable effort cleaning up the address information for these 35,000 voters to ensure they would receive the postcards. However, the printing and mailing company informed me that 700 addresses were rejected by the postal service, so these voters were skipped. In total, I sent postcards to 34,300 registered voters, and of these postcards approximately 600 were returned as undeliverable, meaning that around 33,700 postcards reached potential respondents. The postcard requested for subjects to go to a website and fill out an online survey, using

a unique login code for each respondent which allowed me to match the survey responses to the voter file. The survey was conducted through the internet-based service QuestionPro.com. This website allowed me to set up a unique login for each respondent, employ branching logic in the survey questions, and provide gift cards as rewards to respondents.

In total, I received 800 responses for a response rate of 2.37%. This rate could have been higher given other circumstances, but two main factors limited my response number. First, due to delays with the printing company the registered voters received the surveys less than a week before Election Day, rather than two weeks before as planned. Second, and more importantly, I had to cap the responses at 800 due to limited funding for the Amazon gift cards. I received all of the respondents my budget could afford after just 4 days in the field. Of the 800 responses, 786 could be successfully matched to the voter file after the election. Of these respondents, 19 of them reported that they already voted through using absentee ballots. This leaves 766 valid respondents that could be used to estimate the costs of voting and their effects.

This survey used two different techniques for assessing the costs of voting: specific questions measuring tasks and difficulty, and general questions on the perceived difficulty of the tasks. The specific questions were included both to measure the impacts of the specific factors influencing tasks as well as to test if the general questions are sufficient to capture the costs of voting.

II. iii. Survey Questions: The Perceived Difficulty of Voting

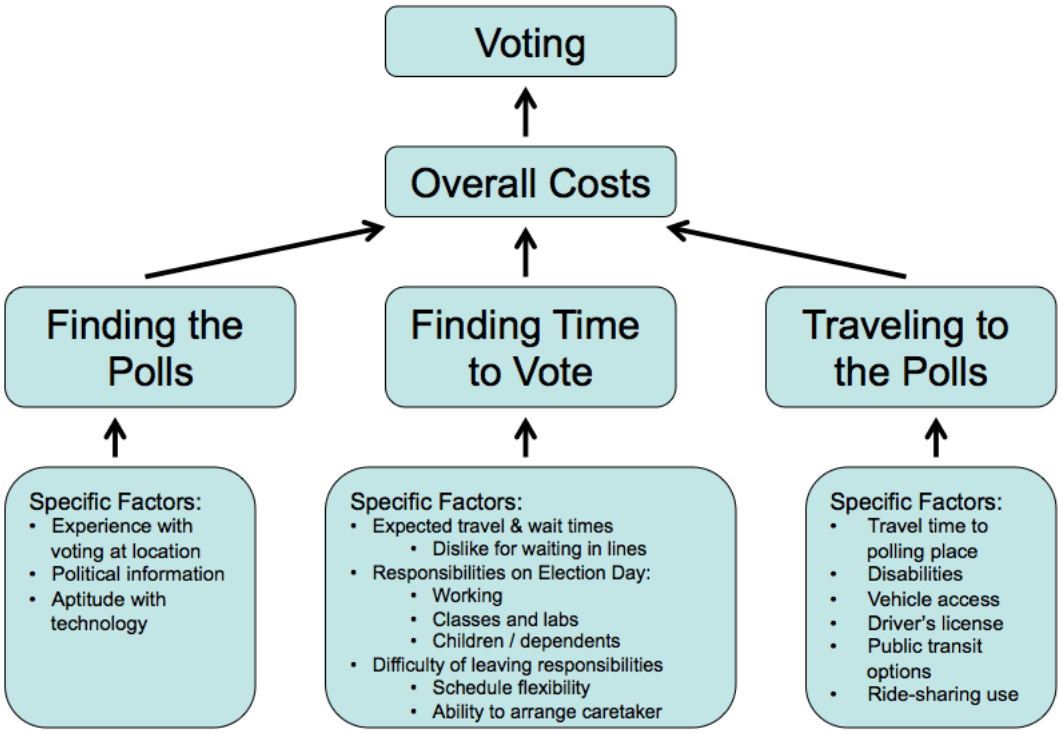
As I described in detail in Chapter 1, the factors that shape both the tasks and the trade-offs of voting vary at the individual level. These individual-specific opportunity costs of performing the tasks of voting are difficult to measure since they depend on a large number of factors about a person's daily life, including his commitments, resources, and responsibilities. Although I also included many specific questions to attempt to measure all the factors shaping voters' opportunity costs, it is very likely that I left out relevant questions since personal circumstances

vary in a number of ways. However, since the respondents are acutely aware of their own circumstances, they should be able to better estimate and compile these opportunity costs themselves if properly primed to think about the tasks.

In order to see if respondents' perceptions of costs perform as well or better than measuring specific cost factors, I included perceived cost questions for each voting task as well as for overall voting. The survey included four questions on the perceived difficulty of voting, one of which asked about overall perceived difficulty and the other three asking about the difficulty of each task. For the text of the specific questions, see questions V5, V6, V9, and V11 in Appendix A. Since most voters may not think of these actions as having "costs," I framed them in terms of "difficulty / convenience." The responses were given by a four-point scale from "very easy / convenient" to "very difficult / inconvenient." To encourage respondents to think about the factors shaping these tasks' difficulties, I included some examples of the factors that could shape these costs in the wording of the questions. I wanted respondents to be primed to think about performing these tasks in order to receive sensible answers. However, I placed these questions prior to the questions on each specific factor to avoid respondents from feeling guided toward a particular type of response.

If my theory about the different areas of costs is accurate, then the specific cost factor questions should relate to overall costs and to voting only through the perceived cost (difficulty) questions. In other words, the perceived difficulty of each task should subsume all of the specific factors that I theorize influence this cost. Figure 3 shows the structure of this theory graphically. Chapter 3 measures how these factors relate to each other to demonstrate that this structure of dividing voting costs into the three tasks is accurate. In Chapter 3, I also conduct analysis to see whether or not the specific factors need to be measured in order to capture the costs of voting, or if the perceived cost questions are sufficient.

Figure 3: Theorized Structure of Voting Costs



II. iv. Survey Questions: Objectively Measuring Specific Costs

I followed each of the perceived cost questions by asking about specific factors that I expected would influence the cost of each task, as well as overall voting as an overarching task. Of course, I was limited by the survey length and by the breadth of my own thinking in which factors I included. In hindsight, I can think of some questions, like asking about disabilities, that I should have included. I did my best at the time of the survey's creation to think of and include as many relevant factors as I could. To describe these questions, I first categorize them by the task of voting that the factor applies to.

II. iv. a. Task: Locating the Polling Place

The perceived difficulty question for locating the polling place (V6) included a response category for "I already know where to go to vote." This category allowed respondents to show that this task is essentially irrelevant to them, since they already possessed the knowledge of where they are assigned to vote. I did not

follow up with any additional specific questions on the factors that could make this information search more costly. In order to complete the survey, respondents had to know how to use the internet and basic computer skills, so asking about these was unnecessary. In retrospect, asking respondents how skilled they are at using Google and navigating websites would provide valuable information on the difficulty of information searches. For this project, the perceived difficulty question combined with prior knowledge represented the totality of the factors I measured on locating the polling place.

II. iv. b. Task: Traveling to the Polls

A number of questions measured factors that I expected would influence the costs of traveling to the polling place to vote. The first question I asked about traveling (V7) inquired about where the respondent would be during the day on Election Day. This question mostly served to prime respondents for thinking about getting to the polls from the location they will be at. I followed this question with how long the respondent thought it would take them to travel to their polling place (V8). This question assumes the respondent knows where their voting location is, but provides a heuristic of two miles away for those who do not know where they vote. There are other ways to get at travel difficulty like distance and impedance, but since both of these factors influence travel time, this measure should also represent these concepts. The perceived difficulty question (V9) followed these first two questions, allowing the respondent to have location and transportation considerations foremost in her mind when she answered the perceived cost question.

After some questions about waiting in line and finding time to vote, the survey asked about other transportation factors such as whether the respondent has a current driver's license (V12) and access to a vehicle on a Tuesday (V13). For respondents who answered no to either question, these questions were followed by a series of questions on alternative transportation options. They were first asked about whether they use public transportation (V14), which addresses both its

availability and accessibility in one question. If respondents said they use public transportation, they were then asked how difficult it is to use these services to "get around town" (V15). These questions were followed by similar questions about whether respondents use Uber or ride-sharing services (V16) and how accessible these services are (V17).

In retrospect, this survey could have been improved by adding questions on disabilities to the travel task questions. Voters who are disabled might have more difficulty driving and getting themselves into the polling place from their cars, even with ADA-compliant facilities. A question on walking speed or physical disability should probably be included in any future survey asking about traveling to the polling place.

II. iv. c. Task: Finding Time to Vote

The cost area that the largest amount of the survey's questions focused on was finding time to vote. The first question on this area of voting costs asked about the respondent's expected wait time (V10). Since waiting in line consumes the largest percentage of time for the overall task of voting, this question is attempting to measure the difficulty of the task itself—the more time needed, the more difficult it is to find the time. I also asked respondents how much they dislike waiting in lines (V30). For those who like to talk to their neighbors or listen to music while waiting, standing in line may not be as odious as it seems to others, representing a difference in trade-offs for the same task.

I tried three different approaches for understanding the trade-offs inherent in setting aside time to vote. The first approach used an analogous activity to voting that doesn't carry the same social desirability as voting to see how costly this time is to the respondent. Question V32 asked respondents if they could get someone to wait in line at the Department of Motor Vehicles (DMV) for them, how much would they pay? This question is intended to measure respondents' opportunity cost of time directly by seeing how much they would pay per hour for someone to perform a time-costly activity.

The second approach I used to measure respondents' trade-offs with time was asking about respondents' responsibilities in their lives. The idea behind these questions is that people with more daily tasks like childcare and working will find it harder to set aside time to vote due to their busy schedules. Question V18 asks about whether the respondent is working, followed by how many hours per week (V19). These questions are followed by the flexibility of the worker's schedule (V20), and the times they work in a typical day (V21). To measure the other types of important responsibilities voters have, I also asked whether the respondent is in school (V24) and whether he takes care of children or other dependents (V27).

The third approach I employed to measure respondents' opportunity cost of time was by asking about what they are doing on a typical Tuesday. Since all voters in Pennsylvania (except for absentee) must cast their ballots on Election Day, these questions ask about what responsibilities they usually have on a Tuesday. Rather than measuring the overall "busy-ness" of a schedule like the second approach, this approach intends to measure the opportunity costs that come with the voter leaving his designated duties for part of the day to go vote. To get at this concept, question V21 asks the respondent what times she works on a typical Tuesday. Similarly, V25 asks about classes and labs on Tuesdays, and V28 asks about watching children/dependents on Tuesdays.

When considering the opportunity cost of leaving responsibilities for a period of time, the flexibility of these responsibilities is important. A stay at home parent who can rely on a cheap babysitter faces a cheaper "time cost" than one who can't leave her child alone or take her along. Question V29 asks about how difficult it is for caretakers to find someone else to take their duties. For students, V26 asks a similar question about the difficulty of skipping class. When workers are scheduled and need to leave work, the difficulty of leaving work matters as well. Question V22 asks how difficult it is to find time off work, and V23 inquires if the respondent would be paid for this time off.

II. v. Other Questions

In addition to the questions measuring both the perceived costs and specific, objective factors, I asked a few additional questions that allow me to test relationships between different concepts. First, I asked about respondents' intention to vote in the election that was only a few days away (V1). I included this question since the relationship between the costs of voting and vote intention has not received much attention in the literature. There are only a few studies that examine the difference between reported voting intention vs. validated voting behavior, and none of these studies look at the impact of voting costs differentially on these two measures (Ansolabehere & Hersh 2012). This question allows me to look at whether and to what degree the costs of voting are included in the development of vote intention. I also asked about past voting frequency (V2) to see if frequent voters might be more likely to over-report voting intention and to see if the costs impact frequent voters less than others.

I also asked a few demographic questions about respondents' children (V36 and V37) and their race/ethnicity (V35). These questions allow me to see if different racial and ethnic groups perceive the costs of voting differently, and if having children causes people to perceive some costs as higher. I also asked about respondents' living situation (homeownership) in V34, their household income in V38, and their education in V33. These questions measure socio-economic status (SES), allowing me to see how much SES influences the costs of voting. By looking at the relationship between SES factors and voting costs, I can see how much of the SES effect on voting goes through high SES making costs "easier to bear" (or in my framework, by affecting the trade-offs dimension of the costs) vs. how much of the SES effect might be explained through other factors.

III. Descriptive Statistics on the Respondents

III. i. Demographics of Respondents

Although the solicitation to participate in the survey was given randomly to registered voters in Pennsylvania, the relatively low response rate (2.37%) means that the survey respondents are not a random sample of the population of registered voters. There is some sort of selection process that influenced whether people responded to the survey, and unfortunately this process cannot be directly observed. Because of this unobserved selection bias, it is important to understand how the sample from my survey compares to the population of registered voters in Pennsylvania.

Tables 1 through 7 show descriptive statistics on the respondents of the survey. Some of the demographic measures for the survey sample can be matched with data from the 35,000 solicited registered voters to see how much the response bias affects the sample demographics. Table 1 compares the survey sample to the solicited population for gender, Table 2 compares the age distributions of the populations, and Table 3 shows the voting frequencies of the respondents and compares them to the verified voting rate for the 2016 general election. As Table 1 shows, the sample is evenly balanced between men and women, although there is a lot of missing data on this variable. Table 2 shows the survey respondents skew slightly younger than the solicited sample, but only by a small amount. In the survey sample, 69.05% of the respondents are under 50 years old, compared with 62.55% of the solicited population. This is partially a result of my over-sampling on recently registered voters, who tend to be younger than established registrants, but may also be due to younger people having more technological skills enabling them to complete the online survey easier.

Table 1: Gender of Respondents

Gender	Number of Respondents	Percentage of Respondents	Percentage of Solicited Sample
Male	244	31.85%	27.97%
Female	240	31.33%	30.51%
Unknown	83	10.84%	12.46%
Missing Data	199	25.98%	29.07%

Table 2: Age of Respondents

Age	Number of Respondents	Percentage of Respondents	Percentage of Solicited Sample
Less than 20	56	7.31%	7.34%
20 to 30	224	29.24%	26.97%
30 to 40	152	19.84%	15.27%
40 to 50	97	12.66%	12.97%
50 to 60	107	13.97%	14.45%
60 to 70	87	11.36%	12.27%
70 to 80	37	4.83%	6.71%
80 to 90	5	0.65%	3.19%
90 to 100	0	0.00%	0.79%
Over 100	1	0.13%	0.03%

Tables 3 to 8 show the remaining demographic measures that could not be compared to the solicited population since the measures are not included in the voter file. As Table 3 shows, the vast majority (82%) of the respondents are Anglo, with the majority of the others fairly evenly split between African American, Hispanic, and Asian. The percentage of white respondents corresponds to the demographics of Pennsylvania residents (79% non-Hispanic white), and the minority numbers are not far off, although with fewer African American respondents than would be expected. However, it is unclear how these numbers

compare to the population of registered voters in Pennsylvania since race and ethnicity are not included in the voter information.

Table 3: Race and Ethnicity of Respondents

Race or Ethnicity	Number of Respondents	Percentage of Respondents
White or Anglo	632	82.51%
Black or African American	41	5.35%
Hispanic or Latino	35	4.57%
Asian or Pacific Islander	34	4.44%
Native American or Alaskan Native	4	0.52%
Other	20	2.61%

Table 4 shows a slight majority of the respondents have a bachelor's degree or higher, which is substantially more than the average of 37.10% for registered voters. However, the respondents' income distribution appears similar to the national registered voter population's distribution. Table 5 reveals that 41% of respondents earn more than $70,000 in household income. When this is compared to census information on the registered voter population, it appears slightly lower than average, although the income classes are not exactly equivalent (43.20% of registered voters had > $75,000 in income). A slightly higher percentage of survey respondents had incomes under $30,000 compared to the registered voter population (14.49% compared to 11.44%). A slight majority of the respondents also own their houses, although a substantial portion (18%) live with their parents or other family in their homes.

Table 4: Education of Respondents

Highest Level of Education	Number of Respondents	Percentage of Respondents
Less than 9th grade	3	0.39%
10th grade	1	0.13%
11th grade	3	0.39%
12th grade, no HS diploma	7	0.91%
High school graduate or equivalent	125	16.32%
Some college, no degree	144	18.80%
Associate degree	69	9.01%
Bachelor's degree	238	31.07%
Master's degree	116	15.14%
Professional school degree	32	4.18%
Doctoral degree	28	3.66%

Table 5: Income of Respondents

Household Income	Number of Respondents	Percentage of Respondents
Less than $10,000	34	4.44%
$10,000 to $30,000	77	10.05%
$30,000 to $50,000	113	14.75%
$50,000 to $70,000	126	16.45%
$70,000 to $90,000	84	10.97%
$90,000 to $120,000	96	12.53%
$120,000 to $150,000	48	6.27%
$150,000 to $180,000	29	3.79%
$180,000 to $210,000	26	3.39%
Above $210,000	31	4.05%
I don't know	28	3.66%
I prefer not to answer	74	9.66%

Table 6: Homeownership and Housing of Respondents

Housing Situation	Number of Respondents	Percentage of Respondents
Own my home	400	52.22%
Rent my home	181	23.63%
In a dorm or other community housing	34	4.44%
With parents or other family in their home	138	18.02%
In an assisted care facility or nursing home	1	0.13%
Other	12	1.57%

Table 7: Respondents' Numbers of Children under 12

Number of Children	Number of Respondents	Percentage of Respondents
No children under 12	563	73.50%
One child	99	12.92%
Two children	70	9.14%
Three children	24	3.13%
Four children	10	1.31%
More than four children	0	0%

Table 8: Respondents' Numbers of Children between 12 and 18

Number of Children	Number of Respondents	Percentage of Respondents
No children over 12	630	82.25%
One child	91	11.88%
Two children	37	4.83%
Three children	5	0.65%
Four children	3	0.39%
More than four children	0	0%

Overall, it appears that the sample is slightly biased toward subjects with higher education levels than the average Pennsylvanian registered voter, but not toward those earning higher incomes—in fact, there is a slight bias toward lower income voters. Depending on how one looks at SES, this suggests two opposing types of biases since SES includes both income and education. If the sample is more educated but lower income, is it higher SES than the population? If one believes that the sample is biased toward higher-SES respondents, it is possible that the costs of voting may be under-estimated. Lower-SES registered voters may face higher voting costs due to less flexible working schedules and less access to vehicles.

Further research on the demographics is needed to see if this bias exists and to what extent it affects the data.

III. ii. Descriptive Statistics on Voting and Voting Intention

Table 9 reports descriptive statistics on the percentage of respondents who reported intending to vote in the November 2016 election. The vast majority of the respondents (95%) reported intending to vote in the election and only 1.6% reported not intending to vote, with the remainder uncertain. Table 10 shows that the largest observed difference between the survey sample and the randomly selected solicitation population is in the rate of voting. Almost 90% of the survey respondents voted in the 2016 election compared to just over 63% of the solicited population. Although I do not have information on voting frequency for the non-respondents, a vast majority of respondents (81.6%) reported voting at least once every four years and 66.72% of the respondents reported voting at least once every two years, which is a larger amount than expected. It seems that frequent voters are more likely to have responded to my survey than less frequent voters, which may bias my estimates of the voting costs downward. However, just over 15% reported having never voted before, likely due to the survey's oversampling of newly registered voters.

Table 9: Voting Intention of Respondents

Voting Intention	Number of Respondents	Percentage of Respondents
Yes	730	95.30%
Maybe	16	2.09%
No	12	1.57%
I don't know	8	1.04%

Table 10: Voting History of Respondents

Voting Since 2011	Number of Respondents	Percentage of Respondents	Percentage of Solicited Sample
Voted in 2016 G.E.	689	89.95%	63.16%
More than once a year	142	18.54%	
At least once a year	232	30.29%	
At least once every two years	137	17.89%	
At least once every four years	114	14.88%	
Rarely	21	2.74%	
I've never voted before	116	15.14%	
I don't know	4	0.52%	

III. iii. Descriptive Statistics on the Perceived Costs of Voting

Table 11 presents descriptive statistics on the respondents' self-reported overall costs of voting (reported as difficulty/inconvenience). Surprisingly, around 83.8% reported that voting was either very or fairly easy or convenient, and only 1.2% of the respondents reported that voting was very difficult or inconvenient. Tables 12 through 14 report descriptive statistics on the costs (difficulty/inconvenience) of finding out where to vote, traveling to the polls, and finding time to vote, respectively. A majority (66.5%) of respondents reported already knowing where to vote, and an additional 26% reported that finding out where to vote is fairly or very easy. Only 6.2% reported it being fairly or very difficult to find out where their neighborhood polling places is. Similarly, only 6.4% of respondents reported it being fairly or very difficult to travel to their neighborhood polling place. The voting task that the most respondents reported being costly or difficult was finding the time to go vote. Just over 15% of

respondents described finding time to vote as either fairly or very difficult for them, and only 43% reported finding time to vote as very easy or convenient.

Table 11: Perceived Overall Costs of Voting

Difficulty of Voting	Number of Respondents	Percentage of Respondents
Very easy / convenient	319	41.64%
Fairly easy / convenient	323	42.17%
Fairly difficult / inconvenient	81	10.57%
Very difficult / inconvenient	17	2.22%
I don't know	26	3.39%

Table 12: Perceived Cost of Locating the Polling Place

Difficulty	Number of Respondents	Percentage of Respondents
I already know where I go vote	509	66.45%
Very easy / convenient	103	13.45%
Fairly easy / convenient	97	12.66%
Fairly difficult / inconvenient	43	5.61%
Very difficult / inconvenient	5	0.65%
I don't know	9	1.17%

Table 13: Perceived Cost of Traveling to the Polls

Difficulty	Number of Respondents	Percentage of Respondents
Very easy / convenient	498	65.01%
Fairly easy / convenient	210	27.42%
Fairly difficult / inconvenient	40	5.22%
Very difficult / inconvenient	9	1.17%
I don't know	9	1.17%

Table 14: Perceived Cost of Finding Time to Vote

Difficulty	Number of Respondents	Percentage of Respondents
Very easy / convenient	328	42.82%
Fairly easy / convenient	314	40.99%
Fairly difficult / inconvenient	94	12.27%
Very difficult / inconvenient	22	2.87%
I don't know	8	1.04%

III. iv. Descriptive Statistics on the Specific Cost Factors

While the previous section described how the survey sample described the difficulty (or perceived cost) of voting and of each voting task, this section will focus on the objectively measureable factors that influence both the tasks and trade-offs of voting. For the task of finding the polling place, the only objective question I asked that related to this task was whether respondents already knew where the polling place was. Since I already described this measure, I will focus on the other two task areas and the factors that influence them, beginning with traveling to the polls.

III. iv. a. Traveling to the Polls

As Table 15 shows, the vast majority of respondents (92.83%) expected that traveling to their polling place would take less than 30 minutes. It seems most respondents did not expect to travel far, although a few (under 1%) thought it would take over an hour to reach the polls.

Table 15: Expected Travel Time

Expected travel time	Number of Respondents	Percentage of Respondents
Less than 10 minutes	539	70.37%
10 to 20 minutes	137	17.89%
20 to 30 minutes	35	4.57%
30 to 40 minutes	16	2.09%
40 to 50 minutes	11	1.44%
50 minutes to an hour	11	1.44%
1 hour to 2 hours	4	0.52%
Over 2 hours	2	0.26%
I Don't know	11	1.44%

Table 16: Driver's License and Vehicle Access on a Typical Tuesday (among those with a license)

Vehicle access & License	Number of Respondents	Percentage of Respondents
Vehicle & license	667	87.08%
License, no vehicle	45	5.87%
Neither	51	6.66%
I don't know	3	0.39%

Table 16 reveals that a vast majority of respondents had both a current driver's license and access to a vehicle on a typical Tuesday. Since the vehicle access question was only asked of those with a license, it is unclear if anyone had a car but no license. Although some people who can drive may choose other transportation options, I would consider the 87.08% with both a license and a vehicle as likely to drive to their polling place.

Table 17: Use of Public Transportation & Ride-Sharing (among those with no vehicle)

Public trans. & Ride shares	Number of Respondents	Percentage of Respondents
I use public transportation & ride-sharing	55	55.56%
I use public trans. only	26	26.26%
I use ride-sharing only	4	4.04%
Neither	14	14.14%

Fortunately, the majority of the people who cannot drive to the polls use some form of public transportation or ride-sharing service like Uber. Only 14 respondents (1.83% of the total sample) reported that they have never used neither public transportation nor ride-sharing.

Table 18: Difficulty of Use of Public Transportation

Difficulty	Number of Respondents	Percentage of Respondents
Very easy	33	40.74%
Fairly easy	36	44.44%
Fairly difficult	5	6.17%
Very difficult	5	6.17%
I don't know	2	2.47%

Table 19: Difficulty of Use of Ride-Sharing

Difficulty	Number of Respondents	Percentage of Respondents
Very easy	25	42.37%
Fairly easy	22	37.29%
Fairly difficult	3	5.08%
Very difficult	3	5.08%
I don't know	6	10.17%

For those who use some form of alternative transportation to driving, the vast majority (85.18% for public transit and 79.66% for ride-sharing) report that it is either fairly or very easy to get around town using these services. Taken together with Table 17, this means that 24 people reported it is difficult to use either service or they don't know how difficult it is, and 14 people do not use either service, for a total of 38 people (4.96% of respondents) who may face large transportation difficulties in getting to the polls.

III. iv. b. Finding Time to Vote

As shown in the previous section on how respondents answered the perceived cost questions, finding time to vote was the task that the largest proportion of respondents reported as difficult. Which specific factors influence this

self-reported cost? This sub-section provides descriptive statistics on these objectively-measured factors, including both factors that influence the amount of time needed to vote (task factors) and factors that shape the opportunity costs associated with this time (trade-off factors).

There are two primary task factors that I asked about regarding finding time to vote. The first is the expected time that the respondent believes it will take to reach his or her polling place. This was previously detailed in Table 15, as it overlaps with factors influencing travel cost. Table 15 shows that the vast majority of respondents (92.83%) expected that traveling to their polling place would take less than 30 minutes. It seems most respondents did not expect to travel far, although a few (under 1%) thought it would take over an hour to reach the polls.

Table 20: Expected Wait Time

Expected wait time	Number of Respondents	Percentage of Respondents
Less than 10 minutes	281	36.68%
10 to 20 minutes	234	30.55%
20 to 30 minutes	93	12.14%
30 to 40 minutes	42	5.48%
40 to 50 minutes	9	1.17%
50 minutes to an hour	11	1.44%
1 hour to 2 hours	4	0.52%
2 hours to 3 hours	7	0.91%
Over 3 hours	0	0.00%
I Don't know	85	11.10%

The next factor that influences the difficulty of the task of finding time to vote is the expected wait time at the polls. While the act of filling out the ballot takes some time, the time spent in line is more variable and is usually seen as more of a

barrier to voting since one cannot vote without filling out the ballot, but one can potentially vote without waiting in line.

Table 20 shows the distribution of expected wait times at the polls for the survey respondents. In my data, 67% of the respondents expected to spend 20 minutes or less in line waiting to vote, and 79% expected to spend less than 30 minutes. However, there were a few (just under 3%) who reported they expected to wait over an hour to vote. In general, people in my survey expected to face longer wait times than travel times.

Next, I will provide descriptive statistics on the factors that influence the opportunity costs of time, or as I call them, the trade-offs associated with taking the time to vote. As I discuss in Chapter 1, the cost of an hour of time can vary greatly depending on alternative uses for that time and whether those alternative uses can be postponed or skipped.

The first trade-off factor has to do with the unpleasantness of waiting in line. Some people are more patient than others, and some people actually may not mind waiting at all as it gives them a chance to talk with their neighbors. As a result, the cost of waiting in line should be shaped by how much people dislike waiting. Question V30 asked people to rank, on a scale from 1 to 5, how much they dislike waiting in lines.

Table 21: Preferences Against Waiting

Dislike Waiting	Number of Respondents	Percentage of Respondents
1 (Don't mind waiting at all)	60	7.83%
2	123	16.06%
3	254	33.16%
4	181	23.63%
5 (I really hate waiting)	146	19.06%
I don't know	2	0.26%

Table 21 provides descriptive statistics on peoples' preferences against waiting in line. The modal category was that people showed a moderate (3 on a 5-point scale) amount of dislike for waiting in lines, but the distribution is clearly skewed where more people dislike waiting than do not mind it.

The next set of trade-off factors have to do with general life situations that can potentially shape how valuable one's time is. For example, someone who is employed could potentially be making money during the time they are voting, and a single parent may need to obtain childcare. In my survey, these situations are represented by a series of questions on whether someone is employed (V18), is a student (V24), or is a caretaker for dependents (V27).

Table 22 provides descriptive statistics on all three questions regarding general responsibilities. Note that the percentages will not necessarily add up to 100% across the three categories since they are not mutually exclusive. In this table, I count a response of "I have a job at the moment" for V18 as employed and any other response as unemployed. For being a student, anyone who responds "I am currently a student" of any type is counted as a student. For caretaking, anyone who said he or she is a caretaker, a nanny, take care of children, or sometimes take care of children is counted as a caretaker.

Table 22: General Responsibilities of Respondents

General Responsibilities	Number of Respondents	Percentage of Respondents
I am currently employed	484	63.19%
I am currently a student	62	8.09%
I am currently a caretaker	276	36.03%
Employed & Student	0	0.00%
Student & Caretaker	5	0.65%
Employed & Caretaker	192	25.07%
None of the three	141	18.41%

Table 22 shows that the majority of the sample is currently employed, over a third of the sample takes care of some sort of dependent person, and less than a tenth of the sample are students of any type. Around a quarter of the sample reported that they both work and take care of dependents, but less than 1% was a student and a caretaker, and no one reported both being a student and working. However, a substantial portion of the sample (around 18%) reported not having any of these three responsibilities.

Since trade-offs involve a notion of alternative activities that are being sacrificed, they apply most obviously when the activities being sacrificed occur at the time of voting—that is, on Election Day. For example, whether or not someone has a child at home may not be relevant if they only have custody of the child on weekends. To capture voters' responsibilities on Election Day, I asked a series of questions about the respondents' responsibilities "on a typical Tuesday." I asked about taking care of dependents on a typical Tuesday (V28), as well as "classes, labs, or other school activities" (V25), and about what times of the day or night the respondent is working on a typical Tuesday (V21). Anyone who reported any amount of working on Tuesday is counted as working on a Tuesday, anyone who reported having school activities as "attending school" on a Tuesday, and anyone who watches a dependent for any part of the day as "watching dependents."

Table 23: Responsibilities on Election Day (a Typical Tuesday)

Responsibilities on Tues.	Number of Respondents	Percentage of Respondents
I am working	364	47.52%
I am attending school	86	11.23%
I am watching dependents	188	24.54%
Working & School	0	0.00%
School & Dependents	5	0.65%
Working & Dependents	85	11.10%
None of the three	218	28.46%

Table 23 shows the distribution of respondents' responsibilities on a typical Tuesday. The responses look similar to the general responsibilities shown in Table 21, but some clear differences emerge. More people reported being in class or lab on Tuesday than being a student, possibly because they might not consider themselves a student if they are attending class part-time. About 16% fewer people reported working on Tuesday than being employed in general, and about 12% fewer people reported taking care of dependents on Tuesday than in general. Over a quarter of the sample reported not having any of these three responsibilities on Tuesdays, meaning they would not face these trade-offs on Election Day.

There is one more factor that needs to be considered when looking at the trade-offs that shape voters' costs of finding time to vote. As mentioned in Chapter 1, the flexibility of a person's responsibilities on Election Day shapes their opportunity cost of time. If a registered voter can easily take off work for a few hours using their saved up vacation time, taking time off to go vote carries a lower opportunity cost from the missed work than if they have an inflexible schedule. Voters who work hourly jobs that do not have flexible schedules should face higher trade-offs associated with missing work since they cannot be paid for this time and may even risk punishment for missed time. Similarly, caretakers who can easily find someone else to watch their dependents for a while face lesser trade-offs than those who struggle to find a babysitter. Students also face a range of punishments for missing classes or assignments ranging from negligible to receiving a failing grade.

To measure the flexibility of peoples' responsibilities, I asked follow-up questions for every person who reported they would be attending school, working, or watching dependents on a typical Tuesday. The questions (V22, V26, and V29) were phrased as "Sometimes people need to (take off work / miss school / leave dependents with a caretaker) for a few hours for reasons like a family emergency, a doctor's visit, or running important errands. In general, how difficult is it for you to (leave work / miss school / have someone else watch your dependents) for a few hours?"

Table 24: Difficulty of Taking off Work

Difficulty	Number of Respondents	Percentage of Respondents
Very easy	124	23.44%
Fairly easy	228	43.10%
Fairly difficult	101	19.09%
Very difficult	61	11.53%
I don't know	15	2.84%

Table 24 shows the distribution of responses to how easily people who reported working said it would be to take time off work. The majority (66%) of people reported leaving work would be easy, but a substantial portion (11%) reported it would be "very difficult" to leave work for even a few hours. These people face the largest trade-offs in that even scheduling time off to vote could be challenging.

Table 25: Difficulty of Skipping School

Difficulty	Number of Respondents	Percentage of Respondents
Very easy	18	14.52%
Fairly easy	51	41.13%
Fairly difficult	33	26.61%
Very difficult	17	13.71%
I don't know	5	4.03%

Table 25 shows the distribution of responses for students regarding the flexibility of their classes, labs, and other activities. Compared to Table 24, a larger percentage (40%) reported missing school assignments was difficult than reported leaving work was difficult (30%).

Table 26: Difficulty of Finding Alternative Care

Difficulty	Number of Respondents	Percentage of Respondents
Very easy	50	26.60%
Fairly easy	62	32.98%
Fairly difficult	42	22.34%
Very difficult	25	13.30%
I don't know	9	4.79%

Table 26 shows a distribution of responses for the difficulty of finding alternative care for dependents that looks somewhat in between the responses for missing school and work. A majority (59%) reported that finding a babysitter or caretaker was easy, but over 13% said this would be very hard. Although I did not ask follow-up questions, this could be due to unique care circumstances that make it hard to find a caretaker (like special needs children or adults with dementia), or due to the cost of care itself.

IV. Conclusion

Since there were no existing surveys that contain comprehensive information on the costs of voting and the factors that affect them, I fielded my own unique survey of registered voters in the state of Pennsylvania to measure these concepts. Using registered voters prevents me from measuring the costs of registration, but has the benefit of providing validated voter turnout information.

Although there are a few concerns that the survey sample is over-populated with frequent voters, it matches the overall population of Pennsylvania or the registered voter population fairly well on gender, age, and income, with a slight bias toward more educated people. If anything, this sampling bias should result in reduced estimates of the impacts of voting costs.

The survey contained a number of specific questions on factors that should influence voting costs as well as four perceived difficulty questions. In Chapter 3, I

test whether the costs of voting seem to divide into the three task areas of locating the polls, traveling to the polls, and finding time to vote. I also examine whether the perceived cost measures reflect objectively measureable factors and whether the specific factors are needed to measure costs accurately.

Chapter 3: Measuring the Costs of Voting

I. Introduction

Since this survey contained the first comprehensive battery of questions intended to measure the individual costs of voting, it is important to demonstrate the performance of the questions. Although I do not have other instruments or objective cost measures to which I can compare these data, I can examine how the different cost measures relate to each other. If the questions are measuring the costs associated with the different tasks needed to vote, they should relate to each other in ways that demonstrate they are measuring these concepts. One of the goals of this chapter is to demonstrate that the costs group into the three task areas and that each task cost contains some unique information.

Another goal of this chapter is to explore whether or not voters' perceptions of costs reflect objectively measureable factors that we believe should affect these costs. For example, the self-reported cost of traveling to the polls should reflect whether or not a voter has access to a vehicle. If perceived costs seem to capture these specific factors, then voters can identify the costs of voting as well or better than researchers trying to impute the cost for them. The final goal of this chapter is to examine whether or not the specific factors need to be measured if we have perceived cost information.

II. Performance of the Perceived Voting Cost Measures

First, I need to demonstrate whether the question on the overall perceived cost of voting is measuring the costs of the three voting tasks. To explore this question, I employ three techniques showing how the overall perceived cost measure relates to the three perceived task cost measures. The first of these employs factor analysis to see whether the measures load onto shared factors. If the three task questions are all contributing to the overall cost measure, they should share a common factor of costs.

Table 27: Factor Analysis of the Voting Cost Measures

Factors	**Eigenvalue**	**Proportion**
Factor 1	1.4355	1.2592
Factor 2	-0.0975	-0.0855
Factor 3	-0.1980	-0.1737
Factor Loadings	**Factor 1**	**Uniqueness**
Finding out where to vote	0.5810	0.6625
Traveling to the polling place	0.7297	0.4675
Finding time to vote	0.7520	0.4345

Table 27 shows that the three task cost questions all share one factor with an eigenvalue greater than 1, which is suggestive that they share a loading onto a common dimension. Additionally, the three questions all load strongly onto this first factor but each contribute uniquely to the factor, which is consistent with three separate tasks that all share one overall dimension.

The next test of the relationship between the measures regresses the three task cost measures on the overall difficulty measure. If the overall difficulty of voting is actually composed of the difficulty of these three tasks plus registration, then the difficulties of each of the three tasks should each positively and significantly affect the overall perceived difficulty of voting.

Table 28 shows that all three of the cost areas have positive and highly statistically significant relationships with the overall cost of voting. Furthermore, the *R*-squared measure shows that the three task costs explain around 40% of the variance in the overall difficulty of voting. This demonstrates that the three tasks explain much of the overall difficulty of voting, but some unmeasured factors also contribute to this perceived difficulty. Since I did not measure the cost of registration, this is consistent with what I expect.

Table 28: Predicting Overall Difficulty of Voting with Tasks

Difficulty of Voting	Coefficient (standard error)	Statistical Significance
Finding out where to vote	0.154	0.000
	(0.026)	
Traveling to the polling place	0.169	0.000
	(0.043)	
Finding time to vote	0.377	0.000
	(0.037)	
Constant	0.563	0.000
	(0.056)	
R-squared	.403	
Observations	723	

The third test of the relationship of the three task cost measures to overall costs involves how the measures predict actual verified voter turnout. First, all four measures should have significant and negative relationships with voting when measured in bivariate relationships. Next, when the three task measures are included together as predictors of voting, the relationships should remain significant if they are truly measuring the difficulties of three separate tasks. Finally, if the overall perceived cost measure captures the information contained in the three perceived cost measures, then the overall difficulty measure should become a statistically insignificant predictor of voting when the three tasks are included as predictors.

Table 29: Predicting Voting with Difficulty Measures

Voting in the 2016 Election	Coefficient (standard error)	Statistical Significance	Observations
Overall difficulty of voting	-0.725 (0.151)	0.000	740
Finding out where to vote	-0.535 (0.106)	0.000	757
Traveling to the polls	-0.876 (0.155)	0.000	757
Finding time to vote	-0.728 (0.144)	0.000	758

Table 29 shows the relationships between the four difficulty measures and voting when they are regressed in separate logistic models. The dependent variable in these models is validated voting in the November 2016 election, operationalized as voted = 1 and did not vote = 0. As I expect, the three task difficulty measures and the overall difficulty measure all have highly significant and negative relationships with voting.

Table 30 shows that when the three task measures are included in the same model as predictors of voting, only finding out where to vote has a statistically significant relationship with voting by the conventional standard of $p < 0.05$. Traveling to the polling place approaches statistical significance, but it appears that finding time to vote no longer has a statistically significant relationship with voting in this model. Clearly the three cost measures are correlated with each other to a degree that including them in the same model creates multi-collinearity, and they do not retain the significant relationships with voting that they have when regressed separately.

Table 30: Predicting Voting with Difficulty Measures

Voting in the 2016 Election	Coefficient (standard error)	Statistical Significance
Finding out where to vote	-0.303	0.022
	(0.132)	
Traveling to the polling place	-0.422	0.057
	(0.222)	
Finding time to vote	-0.250	0.234
	(0.210)	
Constant	3.944	0.000
	(0.357)	
Pseudo *R*-squared	.068	
Observations	745	

It is not clear why the three perceived task difficulty questions are correlated with each other, as I would expect that by measuring different tasks they should not share much correlation. It is possible that some personal characteristics, such as income level or education, could make all these task costs higher for some people. It seems plausible that people working hourly low-wage jobs should be less able to afford a vehicle and will face higher travel costs as well as and inflexible schedule raising their time cost. Additionally, if they are working an hourly job due to a low educational attainment level, this low education may make it harder for them to find out where to vote.

It is also possible that some people perceive everything to be more difficult due to their personalities. Since these questions measure perceived costs instead of objective measures, it is possible that some people perceive the difficulty of everything to be higher than other people in a systematic fashion across any task.

Table 31 shows that when the three cost measures are added as predictors to a logistic model that predicts voting with overall costs, the overall perceived cost

measure becomes statistically insignificant. This is consistent with my expectations in that the three cost measures capture all the information contained in the overall cost measure.

Table 31: Predicting Voting with Difficulty Measures

Voting in the 2016 Election	Coefficient (standard error)	Statistical Significance
Overall difficulty of voting	0.013	0.954
	(0.223)	
Finding out where to vote	-0.324	0.020
	(0.139)	
Traveling to the polling place	-0.423	0.063
	(0.227)	
Finding time to vote	-0.274	0.233
	(0.230)	
Constant	4.011	0.000
	(0.388)	
Pseudo *R*-squared	.074	
Observations	723	

In summary, it seems that the task cost measures mostly relate to each other in ways that I expect if they are actually measuring the difficulty of three separate tasks that all contribute to the difficulty of the overall task of voting. All three questions are related to the overall difficulty question, and they all show the expected relationships with voting. The only evidence that my measures are not performing well is the correlation between the three task difficulty questions.

The relationship between the three perceived difficulty questions could be a result of two possible explanations. The first theory is that some people have higher costs across all three tasks due to personal characteristics like income and education that make all the tasks more difficult. Alternatively, these people could

have personality traits that cause them to perceive the same objective tasks as more difficult. Since the rational utility model of voting involves people comparing perceived costs to perceived benefits of voting, it ultimately does not matter much which theory is correct. If some people perceive the same objective costs to be higher than others do, that should still decrease their likelihood of voting by the rational utility theory.

III. Relationship between Cost Factors and SES

Part of the motivation for this project is that SES variables are not good proxy measures for costs. Although my conceptualization of costs makes a clear distinction between SES factors like education and income vs. specific opportunity costs, it is possible that the costs of voting are strongly correlated with SES. Even if they are very different theoretical concepts, SES could still serve as a good proxy measure for voting costs if individuals with low SES experience higher or lower opportunity costs associated with the voting tasks.

To test these relationships, I run a series of regressions predicting the perceived voting cost measures using each SES characteristic (education, income, and homeownership). Table 32 shows the results of the regressions, which reveal almost no large correlations between the measures.

Table 32: Relationship between Costs and SES

	Overall Difficulty	**Locating Polling Place**	**Traveling to Polls**	**Finding Time**
Education	0.014	-0.004	-0.014	0.009
	(0.016)	(0.020)	(0.014)	(0.017)
Income	-0.002	-0.035*	-0.006	0.007
	(0.013)	(0.017)	(0.011)	(0.014)
Homeownership	-0.152**	-0.221**	-0.146**	-0.185**
	(0.055)	(0.069)	(0.047)	(0.056)

Note: Standard errors in parentheses. ^{t} $p < 0.1$; * $p < 0.05$; ** $p < 0.01$

The traditional measures of socio-economic status, income and education, do not show statistically significant correlations with any of the cost measures except for locating the polling place. Those with higher incomes report significantly less difficulty in finding the polling place, but this correlation is rather small at -0.035. When income is changed from the lowest level (< $10,000) to the highest ($210,000+), the expected perceived cost of locating the polls drops by only 0.31 on a 4-point scale.

Unlike income and education, homeownership, which is sometimes used as an SES measure, is negatively and significantly correlated with all four cost measures. Owning one's home lowers one's perceived overall costs of voting by 0.152, the cost of locating the polls by 0.221, the cost of traveling to the polls by 0.146, and the cost of finding time to vote by 0.185. Although these relationships are much stronger than that between income and locating the polling place and all four relationships are statistically significant, these effects are still relatively small. Owning one's home only changes the cost of finding time to vote by -0.185 on a 4-point scale, which is only 23.7% of a standard deviation (0.782) on this measure. Similarly, homeownership changes the cost of traveling to the polls by 22.5% of an S.D. and overall costs by 20.4% of an S.D.

The relationship between homeownership and locating the polling place appears stronger than for the other factors, but this cost measure is unique in that it has a five-point scale which includes an option for "I already know where to go vote." When I break this question out into a binary measure for already knowing where to vote and a four-point difficulty scale for those who do not know where to go, the relationship looks much different. Table 33 shows the relationships between SES factors and the binary measure as well as the four-point difficulty scale for those who said they do not already know where to vote. The four-point measure has no strong correlations with any SES measures. On the other hand, both income and homeownership are significantly and positively related to already knowing where to vote. Going from the lowest to the highest income changes one's probability of

knowing where to vote by 18.7%, and owning one's home increases this probability by 12.2%.

Table 33: Relationships between SES and Knowing Where to Vote

	Already Know Where to Vote	Locating the Polls
Education	0.008	0.020
	(0.010)	(0.029)
Income	0.021**	0.026
	(0.008)	(0.024)
Homeownership	0.121**	0.006
	(0.034)	(0.102)

Note: Standard errors in parentheses. ^{t} $p < 0.1$; * $p < 0.05$; ** $p < 0.01$

Why would owning one's home and income be positively correlated with already knowing where to go vote? Since polling places are usually kept in the same location every election, people who live in the same location for a longer period of time and vote even occasionally are more likely to know where their polling place is than new arrivals. Those with higher incomes tend to be more residentially stable, and this is especially true of homeowners due to the transaction costs in buying and selling property. This means the effects of income and homeownership on locating the polling place are positive in that they give voters prior knowledge of where to vote. This effect is likely attributable to the residential stability of these voters.

It is curious that homeownership is also significantly related to lower costs of traveling to the polls and finding time to vote, since we would not expect these costs to be related to residential stability. It is possible that home owners live in areas where traveling to the polls is easier due to shorter distances and less traffic on their routes. Regarding the time cost, it is possible that homeowners have more flexible or less busy schedules on average compared to renters. However, these are merely speculative ideas, and this correlation between homeownership and costs needs more investigation.

In summary, the correlation between all the costs and homeownership is strong enough to consider homeownership as a possible weak proxy for the costs of voting, but it does not explain enough of the variance in the cost measures to be an effective substitute for them. Since owning a home at best explains less than 25% of a standard deviation on the cost measures, it seems that most of the variation in costs is explained by non-SES factors.

There is a possibility that the correlations visible between the observed cost measures and voting are artificially small due to the sample population. Since the survey sample is composed of more highly educated people than the population of registered voters, the sample is drawing from people who are mostly on the upper end of the education distribution. As a result, the correlation between education and the costs of voting in the sample may be smaller than we would observe in the larger registered voter population if we could eliminate the sampling bias problem. Unfortunately, it is difficult to overcome this limitation of the sampling framework. This is an area that deserves more study in order to demonstrate that SES is not a reasonable proxy for the costs of voting in the larger population.

IV. Going Deeper: Are Perceived Costs Enough?

Since this is the first in-depth exploration of individual-specific cost factors and which factors have the largest impact on voter participation, it is unclear what the best measurement strategies are for understanding the costs of voting. The most fundamental question regarding measuring voting costs is whether or not voters can accurately self-identify the costs of voting for themselves. As I describe in detail in Chapter 1, there are a number of environmental factors that shape the difficulty of performing each task of voting, such as the distance between the voter and her polling place. At the same time, the voter's costs of performing each task are also shaped by personal factors, like whether or not she is the primary caretaker for a child. The question considered in this section is: Do researchers need to measure all the individual-specific environmental and personal factors shaping the

costs of voting? Or can voters identify the costs accurately using their own perceptions of these costs?

IV. i. Going Deeper: Finding Time to Vote

To address the question of whether researchers need to measure each individual factor influencing costs, I first focus on one particular task: finding time to vote. Of all the three tasks, this was the task that the largest number of people reported was difficult. However, it is also the task that contains the largest number of possible factors that might influence its difficulty. Potential voters must consider both the tasks they perform on a regular basis, tasks specific to Election Day (or Tuesdays), the flexibility of these tasks, and the difficulty of substituting other solutions to these tasks. These complexities mean that answering how costly/difficult it is to find time to vote is much more complicated than answering how difficult it is to find or travel to the polling place. Therefore, this task area provides the toughest test of registered voters' abilities to self-identify the costs of voting.

In order to see how well voters perform at self-identifying the costs they face when voting, I employ two strategies. While the second strategy is detailed in subsection IV. i. c., the first strategy employed here is to use the self-reported task difficulty/cost as a dependent variable and regress the various cost factors on this measure. If respondents are considering these various factors when self-reporting their costs, then these factors should demonstrate significant relationships with the cost measure in directions that are consistent with their predicted impacts. I predict the following:

1. The relationships between tasks and perceived costs will be stronger for factors that apply specifically to Election Day rather than generally.

If when reporting their perceived cost of finding time to vote voters are actually considering the tasks they must work around or sacrifice in order to make it to the polls, then responsibilities on Election Day should matter more than one's general responsibilities.

2. Voters who are responsible for more tasks are more likely to report a higher cost for finding time to vote.

Since more responsibilities leads to more trade-offs with regard to spending time, voters who have more tasks they are responsible for should report higher perceived time costs than those with fewer tasks.

3. Voters who are responsible for tasks that have less flexibility are more likely to report a higher cost of finding time to vote.

Tasks that are less flexible on when they can be performed or that cannot be delayed require paying larger opportunity costs to skip or delay their completion than more flexible tasks. For example, someone who is a sole caretaker for an elderly parent may need to find a substitute to perform her duties, which is difficult and likely costs money. Since tasks that are less flexible require more potential trade-offs that must be made in order to sacrifice them, the opportunity cost of time is higher and therefore the cost of finding time to vote should be higher.

IV. i. a. Predicting Perceived Time Cost using Specific Factors

I will begin with testing Hypothesis 1 by comparing the impacts of tasks that voters must perform generally (at any time throughout the week) and those that are specific to "a typical Tuesday." Using the phrasing of "a typical Tuesday" is intended to prime the respondents to think about their responsibilities on Election Day without making them think specifically about how they will adapt these tasks for voting. Since Election Day falls on a Tuesday, any tasks they consistently must perform on Tuesdays should capture their responsibilities on Election Day. I will compare the impacts of these tasks on the perceived cost of finding time to vote to general responsibilities throughout the week, such as watching children, working, or being in school.

Table 34: Comparing Tasks on Election Day to General Responsibilities

	Model 1			Model 2	
	Coefficient (Standard Error)	**Significance**		**Coefficient (Standard Error)**	**Significance**
Employed	0.263 (0.063)	.000	Tuesday: At Work	0.456 (0.057)	.000
Student	0.528 (0.114)	.000	Tuesday: At School	0.647 (0.093)	.000
Has Dependents	0.069 (0.059)	.245	Tuesday: Watching Dependents	0.186 (0.063)	.003
Constant	1.517 (0.056)	.000	Constant	1.414 (0.046)	.000
Adjusted *R*-squared	.037		Adjusted *R*-Squared	.099	
AIC	1755.7		AIC	1702.8	
Obs.	758		Obs.	758	

Table 34 shows the results of two linear regressions predicting the perceived cost of finding time to vote; Model 1 uses dummy variables for general responsibilities as predictors, while Model 2 uses dummy variables for responsibilities on a typical Tuesday as predictors. Although being employed and being a student have significant, positive effects on the perceived cost of finding time to vote, having dependents at home does not. As I predicted in Hypothesis 1, all of the coefficients for responsibilities specifically on Election Day are larger and estimated with more statistical certainty than the general responsibilities. Further evidence for Hypothesis 1 is that watching dependents on Tuesdays has a significant effect on perceived time cost, but merely having children or other dependents does not. Additionally, the variables in Model 2 explain more of the variance in the cost measure, which demonstrates that responsibilities on Election Day specifically are the ones that matter for the cost of finding time to vote. Table 32 also demonstrates

evidence for Hypothesis 2. Each additional responsibility significantly increases voters' self-reported cost of finding time to vote.

Table 35: Testing the Impact of Responsibility Flexibility

	Model 1		Model 2	
	Coefficient (Standard Error)	**Significance**	**Coefficient (Standard Error)**	**Significance**
Tuesday: At Work	0.343 (0.064)	.000	0.078 (0.102)	.448
Flex (work)	0.085 (0.024)	.000	0.026 (0.030)	.385
Flex * Work			0.158 (0.048)	.001
Tuesday: At School	0.110 (0.138)	.425	-0.203 (0.207)	.329
Flex (school)	0.228 (0.044)	.000	0.169 (0.053)	.002
Flex * School			0.186 (0.093)	.047
Tuesday: Watching Dependents	-0.510 (0.133)	.000	-0.475 (0.132)	.000
Flex (Dep.)	0.309 (0.053)	.000	0.302 (0.052)	.000
Flex * Dep.			(omitted)	
Constant	1.324 (0.050)	.000	1.379 (0.052)	.000
Adjusted *R*-squared	.183		.198	
Obs.	732		732	

To test whether the flexibility of responsibilities matters, there is a complication with these models since respondents only answered flexibility

questions for the responsibilities that they reported having. To test whether the flexibility of the tasks matters on top of the tasks themselves, I have to make an assumption about the flexibility variable. I make the assumption that flexibility = 0 (the least difficulty of leaving the task for a few hours) for those who do not face the task at all. So, someone who works will have the variable for working = 1 and a flexibility variable = somewhere from 1 to 4, while someone who doesn't work will have both variables = 0. Note that flexibility is reverse coded, so a positive relationship would reflect that a more inflexible responsibility increases costs. For these models, the flexibility of each task is measured by a question asking how difficult it is to leave the responsibility for a few hours (for example, to attend a doctor's appointment).

Model 1 in Table 35 shows that the flexibility of one's schedule with regard to all three tasks has a significant and positive relationship with the perceived cost of finding time to vote. Interestingly, the variable for attending school becomes insignificant and the variable for watching dependents remains significant but becomes negative when the flexibility measures are included. These changes in the significance and direction of the dummy variable coefficients suggest that these responsibilities do not impose large opportunity costs of time unless they are inflexible. For example, attending school on a Tuesday seems to have no impact unless the respondent stated that it is difficult for him to miss class. This supports Hypothesis 3 in that the opportunity costs of time are shaped by the ability to re-schedule tasks or extricate oneself from one's responsibilities easily.

Model 2 in Table 35 adds interaction terms between the responsibilities and their respective flexibility measures. Hypothesis 3 predicts that the responsibilities only matter in conjunction with their opportunity costs, meaning the dummy variables for the tasks by themselves should not matter except through their interactions with flexibility. We would observe support for Hypothesis 3 if the constituent terms become statistically insignificant while the interaction terms become statistically significant. With the exception of the interaction between watching dependents and flexibility, which was omitted due to multi-collinearity,

the results are consistent with this expectation. The parameters for working and attending school become insignificant, but the interaction terms between these responsibilities and their flexibility become significant in the expected directions.

Overall, I find strong support for all three hypotheses about how voters' responsibilities and their flexibility affect their self-reported cost of finding time to vote. More tasks increase voters' perceived time costs, but the tasks on Election Day have stronger and more consistently estimated impacts on the cost of finding time than general responsibilities. Furthermore, the flexibility of these tasks matters, as the tasks have little impact on perceived time cost if they are flexible in their nature. These findings suggest that when they are asked about the cost/difficulty of finding time to vote, voters are accurately picturing their responsibilities on Election Day and the trade-offs they need to make to leave these responsibilities for a few hours to go vote.

IV. i. b. Adding in More Factors: What about Voting Time?

Although I have demonstrated that the perceived cost of finding time to vote corresponds to the different duties that registered voters face on Election Day, I have not yet included all of the factors that should influence the cost of finding time to vote. Peoples' large life responsibilities like watching children, working, and attending school all influence the trade-offs they must make for the time that they vote. However, voters also show significant variance in their estimates of the time it takes them to complete the task of voting. They must travel on Election Day to a voting location, typically wait in a line before they can vote, and then fill out the ballot itself. Although people vary slightly in how long they spend in the voting booth, it is safe to assume that the majority of the variance in the time spent voting occurs due to traveling to and from the polls and waiting in line.

Table 36: Estimated wait times

Expected wait time	Number of Respondents	Percentage of Respondents
Less than 10 minutes	281	36.68%
10 to 20 minutes	234	30.55%
20 to 30 minutes	93	12.14%
30 to 40 minutes	42	5.48%
40 to 50 minutes	9	1.17%
50 minutes to an hour	11	1.44%
1 hour to 2 hours	4	0.52%
2 hours to 3 hours	7	0.91%
Over 3 hours	0	0.00%
I Don't know	85	11.10%

Table 36 shows descriptive information on how long voters reported they expected to spend waiting in line. In my data, 67% of the respondents expected to spend 20 minutes or less in line waiting to vote. However, there were a few (just under 3%) who reported they expected to wait over an hour to vote.

Table 37: Expected Travel Times

Expected travel time	Number of Respondents	Percentage of Respondents
Less than 10 minutes	539	70.37%
10 to 20 minutes	137	17.89%
20 to 30 minutes	35	4.57%
30 to 40 minutes	16	2.09%
40 to 50 minutes	11	1.44%
50 minutes to an hour	11	1.44%
1 hour to 2 hours	4	0.52%
Over 2 hours	2	0.26%
I Don't know	11	1.44%

Table 37 shows similar descriptive statistics for how long voters expected it would take them to travel to their polling place. Just over 88% of them reported they expected their travel time to be under 20 minutes, which is encouraging. Less than 1% reported it would take them over an hour to travel to the polls.

Both tables clearly show a wide amount of variation in the amount of time people expected to spend voting. Considering the opportunity costs of time should correspond to the amount of time spent voting, we would expect that voters consider both travel time and wait time when they report how difficult it is to find time to vote. More formally:

4. Respondents who expect to spend more time traveling should be more likely to report a higher cost of finding time to vote.

5. Respondents who expect to spend more time waiting in line should be more likely to report a higher cost of finding time to vote.

Additionally, some people do not mind waiting as much as other people. For some people, waiting can impose an "irritation cost" regardless of what they are sacrificing to be there. In the language of tasks and trade-offs, the sub-task of waiting in line entails a higher trade-off for some people. I would expect that this interacts with the cost of waiting to vote:

6. The impact of expected wait time on the cost of finding time to vote should be stronger for those who dislike waiting to vote more.

To test these hypotheses, I run linear models predicting perceived time costs with predictors being the voter's major tasks on Election Day and adding additional variables for expected travel time, wait time, a dislike for waiting, and an interaction between a dislike for waiting and wait time. These models will not include the flexibility measures from the previous section in order to preserve observations and reduce the complexity of the model. If my hypotheses are correct, we should observe statistically significant coefficients for both travel time and wait time.

Additionally, a dislike for waiting should have a significant effect, but the constituent interaction terms should become insignificant when the interaction term is added.

Table 38: Predicting Perceived Time Cost with Additional Factors

	Model 1	**Model 2**	**Model 3**	**Model 4**
	Coef. (S.E.)	**Coef. (S.E.)**	**Coef. (S.E.)**	**Coef. (S.E.)**
At Work	0.46***	0.36***	0.35***	0.35***
	(0.06)	(0.05)	(0.05)	(0.05)
At School	0.65***	0.42***	0.43***	0.42***
	(0.09)	(0.09)	(0.09)	(0.09)
Watching Dependents	0.19**	0.21***	0.20**	0.20**
	(0.06)	(0.06)	(0.06)	(0.06)
Travel Time		0.14***	0.13***	0.14***
		(0.03)	(0.03)	(0.03)
Wait Time		0.18***	0.16***	0.01
		(0.02)	(0.02)	(0.07)
Hate Waiting			0.11***	0.03
			(0.02)	(0.04)
Wait * Hate				0.04*
				(0.02)
Constant	1.41***	0.86***	0.54***	0.82***
	(0.046)	(0.060)	(0.09)	(0.14)
Psuedo *R*-sq.	.099	.257	.286	.291
AIC	1702.8	1352.1	1322.9	1319.0
Observations	758	674	672	672

Note: Standard errors in parentheses. ^{t} $p < 0.1$; * $p < 0.05$; ** $p < 0.01$

Table 38 shows multiple models, each one adding an additional parameter as described in the previous paragraph. As we can see, each factor has a strong, significant impact on voters' perceived cost of finding time to vote. Additionally, the

interaction term added in Model 4 between a dislike for waiting and expected wait time in is significant while the constituent terms for the interaction both become statistically insignificant. This means that these data demonstrate strong support for all three hypotheses described above. Voters seem to be considering factors that shape the time they spend voting as well as the trade-offs associated with this time. Furthermore, voters appear to consider their dislike for waiting and weigh their wait time in conjunction with this preference. These findings suggest that voters are making quite complicated assessments of many different factors when they report their perceived costs of voting.

IV. i. c. Comparing Specific Factors and Perceived Cost

In the previous section, I regressed the task factors on the perceived task cost to show that voters are considering all the individual-specific factors when self-reporting the cost of finding time to vote. The second strategy I use to see if perceived costs are accurate relies on information theory. Under information theory, adding more predictive factors is not necessarily desirable if the additional factors are not contributing much to the predictive power of a model. Information theory relies on the idea that theories should be parsimonious in explaining phenomena, and adding more complexity should always be balanced against the amount of information added by the new factors (Schwarz 1978).

It may seem obvious that the self-reported difficulty of a task by itself is a much more parsimonious predictor of the task's cost than a multitude of individual-specific factors. However, if the perceived difficulty of the task does not incorporate these specific factors into its measure, it will not predict the cost well and thus will not be parsimonious, since this requires predictive power. The task at hand, then, is to use information theory measures to compare models that contain the specific cost factors to models that only contain the one perceived difficulty measure.

How can these models be compared without some measure of the "true" cost of this task? Although an individual's utility function weighing costs and benefits is unobservable, I argue we can consider the impact of these factors on participation

as a proxy for their impacts on the "true" cost of the task. If we assume that respondents vary randomly in how they perceive the benefits of voting, then any systematic relationships between cost factors and participation result from the impact of these factors on costs, and costs on participation. This analysis relies on the assumption that there are no systematic relationships between the costs and the benefits of voting, which is a strong assumption that should be tested in further research.

Based on this assumption, my approach is to use logistic models of whether or not a registered voter cast a ballot in the 2016 general election and include different cost measures as predictors. If adding in the individual-specific factors does not increase the information of the model, then we can conclude that the individual-specific factors are not needed and the perceived cost measure is sufficient for measuring this cost area. On the other hand, if I find that the individual-specific factors substantially increase the information contained in the model, we would conclude that accurately measuring this cost requires more specific and objective measurements than the perceived difficulty measure. As an objective measure of the information in the model, I employ Akaike's Information Criterion (AIC). The AIC uses the likelihood of the model and the number of parameters to generate a statistic that is comparable among models with the same observations and dependent variables. Although it is only a relative statistic, it is useful for comparing more complex models to simpler models by adding and subtracting variables from what is otherwise the same model using the same data (Burnham & Anderson 2002).

Table 39 shows the results of a model predicting voting in the 2016 general election as a function of just the perceived cost of finding time to vote (Model 1), just the specific factors that influence this perceived task cost (Model 2), or the perceived task cost in addition to the specific, objectively measureable factors. The first takeaway is that while we observed earlier that the specific cost factors influence the perceived cost of finding time to vote, many of these specific factors do not have a significant impact on the behavior of voting.

Table 39: Predicting Voting using Perceived Costs vs. Specific Factors

	Perceived Difficulty	**Individual Factors**	**Perceived Difficulty and Indiv. Factors**
	Coef. (S.E.)	**Coef. (S.E.)**	**Coef. (S.E.)**
Perceived Difficulty of Finding Time	-0.638*** (0.161)		-0.461* (0.203)
At Work		0.405 (0.312)	-0.623^{t} (0.333)
At School		-0.129 (0.464)	0.108 (0.477)
Watching Dependents		-0.590^{t} (0.303)	-0.466 (0.311)
Travel Time		-0.289** (0.106)	-0.242* (0.109)
Wait Time		-0.141 (0.326)	-0.137 (0.322)
Hate Waiting		-0.223 (0.219)	-0.200 (0.220)
Wait * Hate		0.0001 (0.080)	0.018 (0.079)
Constant	3.527*** (0.354)	3.916 (0.845)	4.300*** (0.861)
Psuedo *R*-sq.	.038	.059	.072
AIC	388.64	392.04	388.92
Observations	672	672	672

Note: ^{t} $p < .1$; * $p < .05$; ** $p < .01$; *** $p < .001$

However, the main finding from Table 39 is that using the specific cost factors does not increase the information in the model over using the perceived cost of finding time to vote by itself. The model with the lowest AIC is the model which only uses the perceived cost to predict voting, although it is basically indistinguishable in its information score from the model with both the specific factors and the perceived cost. What this means is that the specific, objectively measureable factors like travel time, being at school on Tuesday, etc. do not contribute enough new information to justify their inclusion in the model.

However, Table 39 only shows models with all or none of the specific factors, this finding does not necessarily hold true for any combination of one or more

specific factors with the perceived difficulty. Although it would be beyond the scope (and purpose) of this project to analyze every possible combination of variables to attain the lowest possible AIC, it is worth looking at what happens to this comparison if some of the least predictive variables are removed.

Table 40: Predicting Voting using Perceived Costs vs. Specific Factors

	Perceived Difficulty	**Individual Factors**	**Perceived Difficulty and Indiv. Factors**
	Coef. (S.E.)	**Coef. (S.E.)**	**Coef. (S.E.)**
Perceived Difficulty of Finding Time	-0.638*** (0.161)		-0.679** (0.175)
At Work		0.163 (0.297)	0.535 ^{t} (0.322)
At School		-0.570 (0.424)	-0.067 (0.454)
Watching Dependents		-0.612* (0.296)	-0.413 (0.306)
Constant	3.527*** (0.354)	2.522*** (0.241)	3.496*** (0.362)
Psuedo *R*-sq.	.038	.015	.052
AIC	388.64	401.57	388.85
Observations	672	672	672

Note: ^{t} $p < .1$; * $p < .05$; ** $p < .01$; *** $p < .001$

Table 40 shows the results of the same logistic regressions predicting voting as Table 39, but excluding the variables for travel time, wait time, a dislike for waiting, and the interaction term between the last two. Although travel time is a good predictor of voting, I exclude it from this model since it overlaps two task costs: finding time to vote and traveling to the polls. It would not be a fair test of the perceived time cost to include a predictive measure whose effect is probably overlapping also with the perceived travel cost. With the specific cost factors reduced to the most important terms, Models 1 and 3 are still equivalent in their AIC scores.

There are a few conclusions that we can draw from this subsection. First, the perceived cost factor is definitely needed to predict voting accurately, as by itself it is a better predictor of voting than the combination of many cost factors. Second, adding in too many predictive terms, such as the 6 specific cost factors plus an interaction like in Model 3 in Table 39, is inefficient in that it includes too many unnecessary variables.

Since the specific cost factors do not add a very large amount of additional information, voters are for the most part reporting very sensible perceived costs that largely line up with their specific, objectively measureable factors like working or attending school. These data largely support my hypothesized structure of costs as grouping into task areas (like finding time to vote) and they support the idea that voters are aware of what shapes their costs, and they can sensible self-report costs without having to go through a multitude of specific questions.

Now we can formulate an answer to one of the questions posed at the beginning of this section: Do we need the specific cost factors to predict voting? The answer is yes if we are trying to use all present information to create the best predictive model as judged by the pseudo *R*-squared measure. However, this need must be balanced against the need of survey instruments to be as parsimonious as possible in order to have low costs and short survey times. The AIC measure, which is based on information theory, clearly shows that a model without the specific cost factors uses the information just as efficiently as a more complicated model with the specific factors. Given the need for shorter survey instruments to reduce costs, these data suggest that surveys need only include a measure of the perceived cost of finding time to vote in order to capture this task cost.

IV. ii. Going Deeper: Traveling to the Polling Place

The other task for which the perceived cost measure needs to be validated is the cost of traveling to the polling place. For the third task (finding the polling place), I did not ask any questions on objectively measureable specific factors that allow this type of validation. Although I do not have as many measured factors that

influence the cost of traveling to the polls as I do for finding time to vote, there are enough questions about transportation options and travel time to warrant an investigation.

IV. ii. a. Predicting Perceived Travel Cost using Specific Factors

My theory in Chapter 1 lays out the idea that the costs of each task are shaped by both environmental factors that affect the task itself, and personal factors that affect one's trade-offs associated with the task. For the task of traveling to the polls, environmental factors include the voting system (like vote by mail vs. in-person balloting), the distance to the polling place, and the impedance of the route to the polls (traffic, obstacles like intersections, etc.). To measure these environmental factors, I chose to ask about expected travel time rather than separate questions on distance, impedance, etc. Expected travel time is a concept that people can answer even if they do not know exactly where the polling place is, while the other questions rely on more personal experience. Question V8 asks respondents how long they expect it would take them to travel to the polling place, and is the only question in my survey to measure a specific factor influencing the task itself. My first hypothesis for this subsection is that longer travel times should increase travel costs:

7. Respondents who report longer expected travel times should be more likely to report higher costs of traveling to the polls.

I asked a series of several questions regarding the trade-offs that voters face when trying to accomplish the task of traveling to the polls. Question V12 asks respondents if they have a current drivers' license, and Question V13 asks voters if they have access to a vehicle on Tuesdays. Both of these measures together provide information on whether the respondent can drive herself to the polls on Election Day. My next hypothesis in this section is that vehicle access should reduce travel costs:

8. Respondents who can drive themselves to the polling place should be less likely to report higher costs of traveling to the polls.

For respondents who answered that they did not have a vehicle or a license, I assume that they must walk, bike, use public transportation, or a ride-sharing service to get to the polls. I asked a series of questions about their use of these services and how convenient they are to use. Question V14 asks if respondents use public transportation, and V15 asks how difficult it is to travel around town using this service. I asked equivalent question about ride-sharing services like Uber or Lyft (V16 and V17). My next hypotheses are that these services should reduce travel costs, and more so if they are convenient:

9. Respondents who use public transportation or ride-sharing services should be less likely to report higher costs of traveling to the polls.

10. The impact of using public transportation or ride-sharing services on the cost of traveling should be larger for those who report the services are more convenient.

I test these three hypotheses using a similar design to what I employed for the analysis of the cost of finding time to vote. I use dummy variables for vehicle access, public transportation use, and ride-sharing use to predict the self-reported cost of traveling to the polls in a linear regression. If Hypothesis 7 is correct, those who report a longer travel time to the polls should report a higher traveling cost. Table 41 shows the results of a linear regression where expected travel time is regressed on perceived travel cost.

Table 41 provides strong support for Hypothesis 7. As expected travel time increases, respondents' self-reported cost of traveling to the polls increases. A 4-unit change in the travel time (40 minutes for most of the range) would increase the expected travel cost by over 1 unit on the 4-point difficulty scale, for example from "fairly easy" to "fairly difficult."

Table 41: Predicting Travel Cost with Time

Difficulty of Traveling	Coefficient (standard error)	Statistical Significance
Expected travel time	0.287	0.000
	(0.019)	
Constant	0.972	0.000
	(0.035)	
R-squared	.239	
Observations	750	

If hypotheses 8 and 9 are correct, the dummy variables for each of these factors should be statistically significant and negative, as they should each significantly reduce the cost of traveling to the polls. Table 42 shows the results of a linear regression where the three transportation options are used as dummy variables to predict self-reported traveling cost.

Table 42: Predicting Travel Cost with Transportation Options

Difficulty of Traveling	Coefficient (standard error)	Statistical Significance
Vehicle Access	-0.323	0.045
	(0.161)	
Public Transportation	-0.185	0.310
	(0.183)	
Ride-Sharing Services	0.271	0.060
	(0.144)	
Constant	1.701	0.000
	(0.159)	
R-squared	.033	
Observations	755	

The results in Table 42 provide mixed evidence for Hypothesis 8. Vehicle access is a statistically significant predictor of travel costs and shows the expected negative relationship with costs; having a vehicle makes most people report traveling to the polls is less difficult. Using public transportation has the expected negative coefficient, but the variable is statistically insignificant so no conclusions can be drawn about its impact. The use of ride-sharing services is almost significant at conventional levels, but actually shows the opposite of the predicted coefficient from Hypothesis 9; it appears that use of ride-sharing services could increase this cost. It is possible that the small number of observations on people who use ride-sharing and public transit prevents us from finding a relationship with travel costs. It is also possible that no relationship can be seen until we consider the convenience of these transportation options as well; riding the bus may not decrease travel costs unless the bus provides a convenient enough route and schedule to make it preferable to walking.

If hypothesis 10 is correct, there should be an interactive effect between the convenience of using public transit and ride-sharing and the use of these options. To test this hypothesis, I first run a model adding in the convenience of each option as additional predictive variables. Then, ideally I would interact these terms with the dummy variables for using these options to see how they affect self-reported travel costs. As I describe below, this was not possible with these data.

Table 43: Predicting Travel Cost with Transportation Options and Convenience

Difficulty of Traveling	Coefficient (standard error)	Statistical Significance
Public Transportation	-0.586	0.046
	(0.289)	
Convenience (Public Trans)	0.339	0.002
	(0.106)	
Ride-Sharing Services	-0.188	0.469
	(0.258)	
Convenience (Ride-Sharing)	0.252	0.041
	(0.121)	
Constant	1.616	0.000
	(0.194)	
R-squared	.178	
Observations	93	

Table 43 shows the results of the first model, which adds in the convenience variables for public transportation usage and ride-sharing. Since the convenience questions were not asked of people who had vehicles, I have reduced the observations for this model to just the people who cannot drive themselves. Although this reduces the statistical power of the model, I still find interesting relationships. Both access to public transportation and to ride-sharing now have the negative relationships predicted by Hypothesis 9, although ride-sharing is still insignificant. However, the main interesting result is that the convenience of both forms of transportation has a significant and positive relationship with the travel cost. Options that are more difficult seem to increase the travel cost, but interactive models are needed to confirm this. Unfortunately, due to the few number of observations, I could not run interactive models as it would result in omitted variables for each interaction term. However, the evidence in Table 43 is strongly

suggestive that the effect of the presence of transportation options is mediated by how convenient they are to the voter.

IV. ii. b. Comparing Specific Factors and Perceived Cost

The final subsection of this chapter uses information theory to see if the perceived cost of traveling to the polls captures the information present in the specific cost factors like vehicle access and transportation convenience. To see if the specific measures add more information that is not contained in the perceived measure, I employ the same strategy as I did for the cost of finding time to vote. I run logistic regressions on voting using the perceived cost measure and specific objective cost measures to see which model captures the information most efficiently.

Table 44: Predicting Voting using Perceived Cost vs. Specific Factors

	Perceived Difficulty	**Individual Factors**	**Perceived Difficulty and Indiv. Factors**
	Coef. (S.E.)	**Coef. (S.E.)**	**Coef. (S.E.)**
Perceived Difficulty of Transportation	-0.875*** (0.155)		-0.867*** (0.161)
Vehicle Access		0.690 (0.698)	0.505 (0.710)
Public Trans.		2.981* (1.522)	2.875^{t} (1.630)
Conv. (Public Trans.)		-0.578 (0.491)	-0.356 (0.499)
Ride-Sharing		-1.934 (1.364)	-2.327 (1.510)
Conv. (Ride-Sharing)		0.177 (0.449)	0.421 (0.483)
Constant	3.607*** (0.299)	1.580*** (0.686)	3.086*** (0.759)
Psuedo *R*-sq.	.062	.017	.073
AIC	458.40	488.22	462.99
Observations	755	755	755

Note: ^{t} $p < .1$; * $p < .05$; ** $p < .01$; *** $p < .001$

Table 44 shows the results of logistic regressions on voting with and without different predictive variables. Judging by the AIC, the model containing solely the perceived difficulty of traveling to the polls makes the most efficient use of the information present in these data. When the specific factors are used in Model 2 without the perceived cost measure, they predict voting very poorly as seen by the much higher AIC and substantially lower pseudo *R*-squared. Although adding in the specific factors in Model 3 increases the pseudo *R*-squared, these variables are all insignificant at conventional levels and are unnecessary by the AIC measure as they are not adding any substantial information not already captured by the perceived cost measure.

Similarly to the analysis on the perceived cost factor for finding time to vote, this analysis shows the perceived cost factor is definitely needed to predict voting accurately. None of the specific cost factors come close to explaining as much variance in voter turnout as the perceived difficulty of traveling to the polls. This means that much like the cost of finding time to vote, voters are for the most part reporting very sensible perceived traveling costs that largely correspond with their objectively measureable factors like vehicle access or use of public transportation. These data largely support my hypothesized structure of costs as grouping into task areas (like traveling to the polls) and they support the theory that voters can self-report their own costs for each task without having to report on a number of specific factors.

In subsection IV. i. c., I showed that we do not need the specific cost factors for finding time to vote to create a parsimonious model of voting. Now, we can formulate an answer to this question for transportation costs as well. If we are trying to use all present information to create the best predictive model, then we would want to include as many measures as possible. However, if we want a parsimonious survey instrument that can easily be fielded and will yield good predictive power, information theory shows that we only need to use the perceived cost measure for traveling to the polls.

V. Conclusion

In this chapter, I demonstrated that consistent with my theory from Chapter 1, the costs of voting group into three distinct task areas of finding time to vote, locating the polls, and traveling to the polls. The self-reported perceived costs for each task area accurately reflect objectively measureable factors that should influence the costs of each task and these cost-shaping factors mostly do not contribute information except through these perceived costs. Presumably if I had measured details on finding the polls and if I could have measured registration costs they would have also shown unique information that corresponds to specific factors shaping the registration task and its trade-offs.

However, the cost areas share some correlation, as seen by their loading on a common factor and how the parameters react when all the costs are included in the same model. This correlation is not unexpected, first because psychological factors may cause respondents to report difficulty in different ways, with some consistently over- or under-estimating. Additionally, SES factors may cause respondents to experience costs that are correlated in a more objective sense. People working low-income hourly jobs probably face higher costs in other areas in addition to how this job affects their time. Even if it is not surprising, this correlation presents some difficulties in estimating the impacts of the costs in the next chapter and should be a topic for further research.

One interesting question motivating this project was the relationship between the costs of voting and socio-economic factors. In this chapter I demonstrated that the task costs are largely separate from SES factors, which implies that the resource theory is insufficient as an explanation for how SES affects voting. Although homeownership is correlated with voting costs, the correlation is not enough to explain most of the variation in the costs, which seems to come more from non-SES factors like having childcare responsibilities or an inflexible schedule. for their separation as distinct concepts rather than as proxies for each other.

Finally, I showed that at least for the tasks of finding time to vote and traveling to the polls, the perceived cost measures are sufficient for measuring the costs of voting in surveys. Although adding specific cost-shaping factors like vehicle access can improve the predictive power of models, information theory shows that these factors are not necessary for an efficient model predicting voting. This is good news for future studies because it means researchers only need to ask three or four questions to capture the totality of voting costs.

Chapter 4: Impacts of the Costs of Voting

I. Introduction

In the previous chapters, I laid out a theory for the structure of the costs of voting, created an instrument to measure them, and showed which measures are needed to capture the costs of voting. Now that I have established the utility of the survey instrument for measuring costs, the remaining questions my project aims to answer have to do with the impact of these costs. Specifically, how much do the costs of voting impact political participation in terms of validated voter turnout? If we know how much different voting costs affect turnout, then we can combine this information with predictions or information on how different election reforms affect costs. Combined together, these data would allow us to see how much voting policies affect voting specifically through the cost pathway. This would also allow us to generate more accurate answers to the question: If we adopted a specific policy that changed the costs of different tasks, how much would these changes impact turnout in the electorate?

Additionally, I am interested in how much these costs impact peoples' intentions to vote as well as actual behavior. Vote intention is often used as a proxy for voting in surveys, so it is useful to know if voters have considered the costs of voting when reporting vote intention. Although multiple studies have looked at vote intention and the factors that shape it or connect it to behavior, none have examined the effects of voting costs on intention to vote. As I describe in section III of this chapter, behavioral theories connecting intention to behavior suggest different possibilities for how costs affect intention to perform an action. One goal of this chapter is to see if these behavioral theories can be joined in some way to the rational utility model by seeing whether costs affect vote intention like they do voting behavior.

II. Impacts of the Costs of Voting on Validated Voting Behavior

II. i. Statistical Models

How much does each of the three tasks of voting for registered voters affect their likelihood of showing up to cast a ballot on Election Day? In Chapter 3 I showed that, at least for the two task areas I had enough specific questions on, the perceived task costs provide succinct summaries of all the specific factors that influence voters' costs of performing each of the tasks of voting. Voters are aware of the specific influences on their costs, and they seem to report perceived difficulty of each task based on their unique combinations of factors. Therefore, we can get a good idea of how much costs can impact voter turnout by looking at these perceived difficulty questions and their substantive effects on predicted voter turnout.

There is a challenge in accurately reporting the impact of each task cost on voting—the correlations between the task costs among the survey respondents. As I pointed out at the beginning of Chapter 3, there is some correlation between the different cost factors from an uncertain origin. It could be the case that some people have substantially higher costs across all three tasks as a result of their particular life circumstances. If people who have childcare responsibilities or inflexible work hours are also less likely to have a vehicle, this could create a correlation between the cost areas. For example, a fast food worker may not have the money for a car due to his job's low wages, and he also has an inflexible schedule that increases his time cost since the service industry provides strict hourly shifts. However, it could also be the case that some people tend to perceive everything to be more difficult than other people. If some survey respondents see everything as more costly, they might report all task costs as higher just due to the way they perceive survey questions or the concept of difficulty.

The correlation between factors presents a predicament for seeing their "true" impacts on voter turnout. If they all tend to vary together due to life circumstances as in the first explanation, then the "true" impact of a task cost is its direct effect on voting as well as its indirect effect through other task costs on voting. For example, if finding time to vote is difficult for a voter because of his

inflexible schedule from a low-paying job, and transportation is also difficult because his job does not pay enough to afford a car, then looking at the effect of the time cost alone is not an accurate reflection of his costs. This would suggest we should not control for the other cost areas when predicting a cost's impact in order to see its full effect.

On the other hand, if the costs vary together because of some psychological mechanism that causes some people to answer all the questions with higher or lower costs, then we should only look at the direct impact of a cost on turnout. This would suggest that we should control for the other cost areas so as to not inflate the impact of a task cost on voting.

Table 45: Impact of Cost Areas on Validated Voter Turnout

	Model 1	**Model 2**	**Model 3**	**Model 4**
Locating Polling Place	-0.535***			-0.303*
	(0.106)			(0.132)
Traveling to the Polls		-0.876***		-0.422^{t}
		(0.0155)		(0.222)
Finding Time to Vote			-0.728***	-0.250
			(0.144)	(0.210)
Constant	3.190***	3.607***	3.667***	3.944***
	(0.250)	(0.299)	(0.332)	(0.357)
Psuedo *R*-squared	.049	.062	.052	.068
Observations	757	757	758	745

Note: Standard errors in parentheses. ^{t} $p < 0.1$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Since I am not sure which strategy is more justified in this situation, I run both types of analyses: one in which I estimate the impact of each cost independently, and one in which I estimate the impact of each cost while controlling for the other costs. Table 45 reports the results of both of these analyses for the

costs of all three tasks needed to vote. Each of Models 1 through 3 examines the impact of individual task costs separately on the probability of voting, while Model 4 examines the impact of each task cost when all three are included in the same model. Comparing the magnitude and statistical significance of each of the cost variables' impacts between the separate models and Model 4 reveals how the correlation of these cost factors substantially reduces their calculated effects when they are all placed in the same model.

II. ii. Substantive Effects

Since these are logistic models of voter turnout, the coefficients from Table 45 are not easily interpretable as substantive effects. To clearly show the substantive effect of each cost in the different models, I generate substantive effects by calculating predicted probabilities while holding all variables at their median values and modifying only the variable of interest. To generate confidence intervals for the predicted probabilities, I use Clarify software to perform parametric bootstraps on the models. The figures below show the substantive impacts of the different task costs with 95% confidence intervals generated through this process.

Figure 4 shows the substantive impact of the cost of locating the polling place on the predicted probability that a voter will cast a ballot. This substantive effect is calculated from Model 1 without controlling for the other task costs. Figure 1 shows that changing this task from the least difficult (already knowing where to vote) to the most difficult decreases the probability of voting by .243.

Figure 4: Substantive Effect of Locating the Polls (without controls)

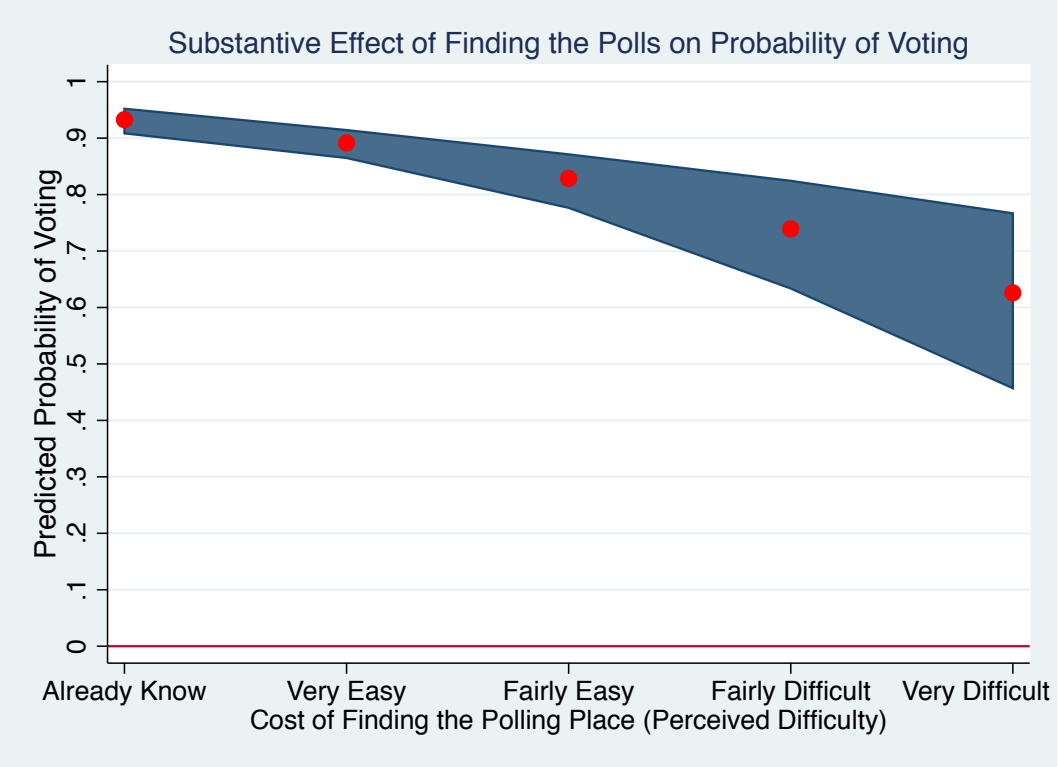


Figure 5: Substantive Effect of Locating the Polls (with controls)

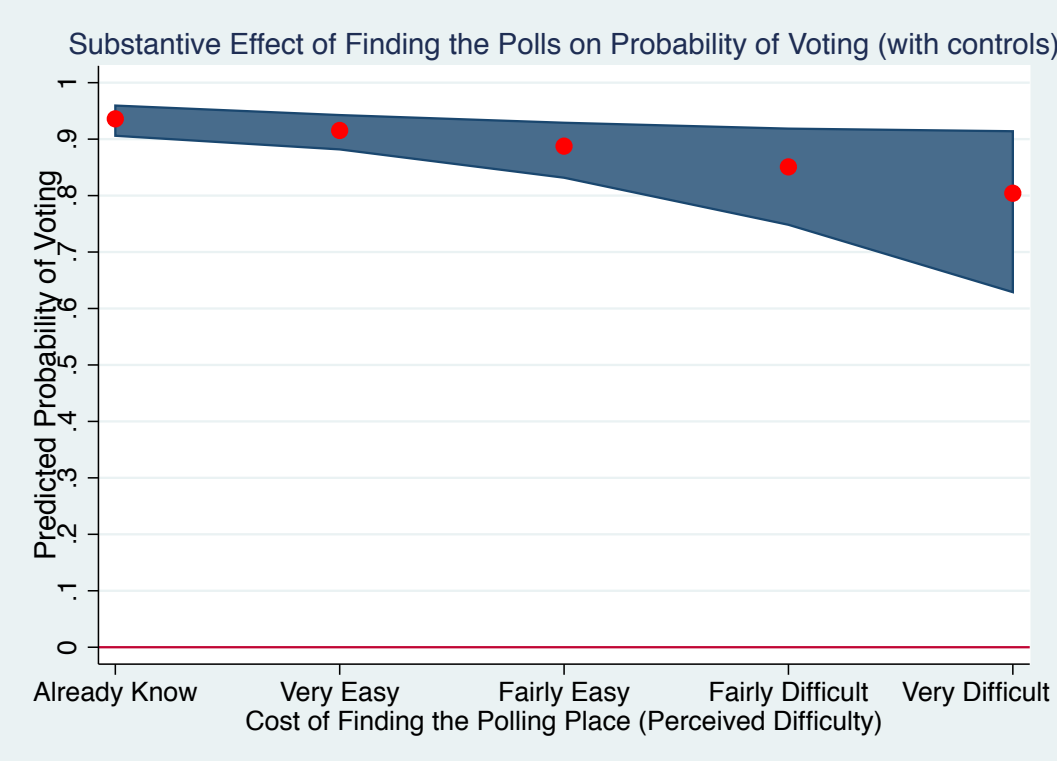


Figure 5 shows the same substantive impact of locating the polls, but it is calculated from Model 4, in which the other task costs are control variables. When the impact of finding the polling place is isolated from the other factors, its direct effect is much smaller than its full effect shown in Figure 4. Now the substantive effect is only .128, which although substantial is around half of the effect seen by this cost without controlling for the other costs.

Figure 6: Substantive Effect of Traveling to the Polls (without controls)

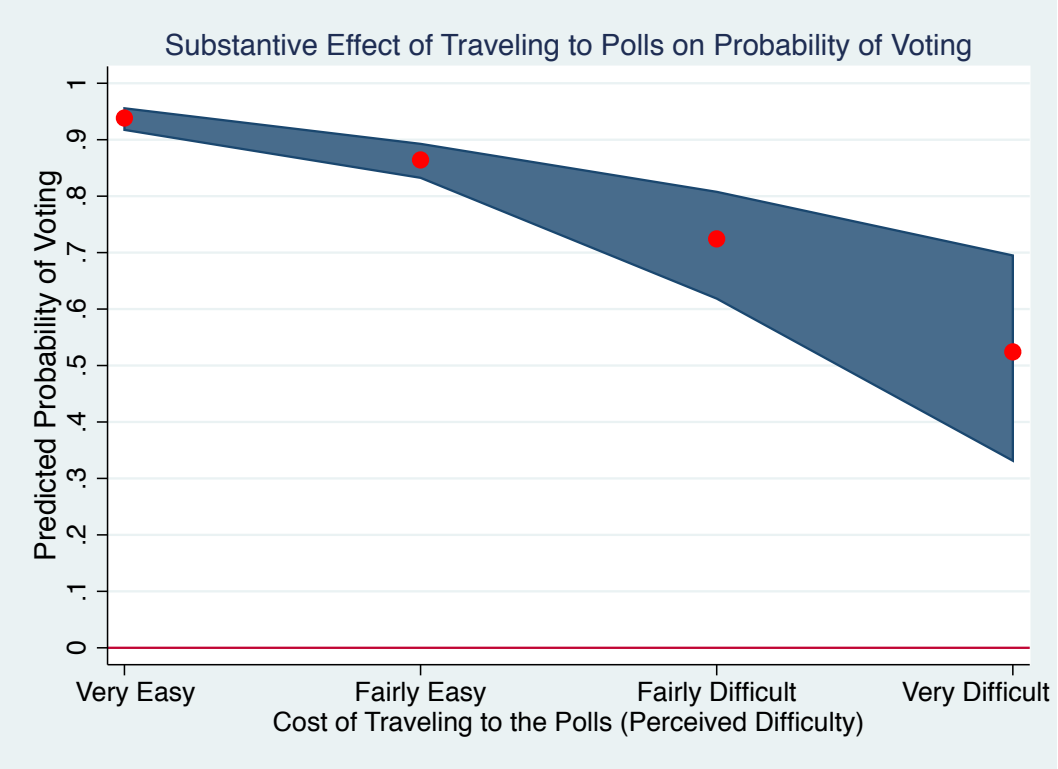
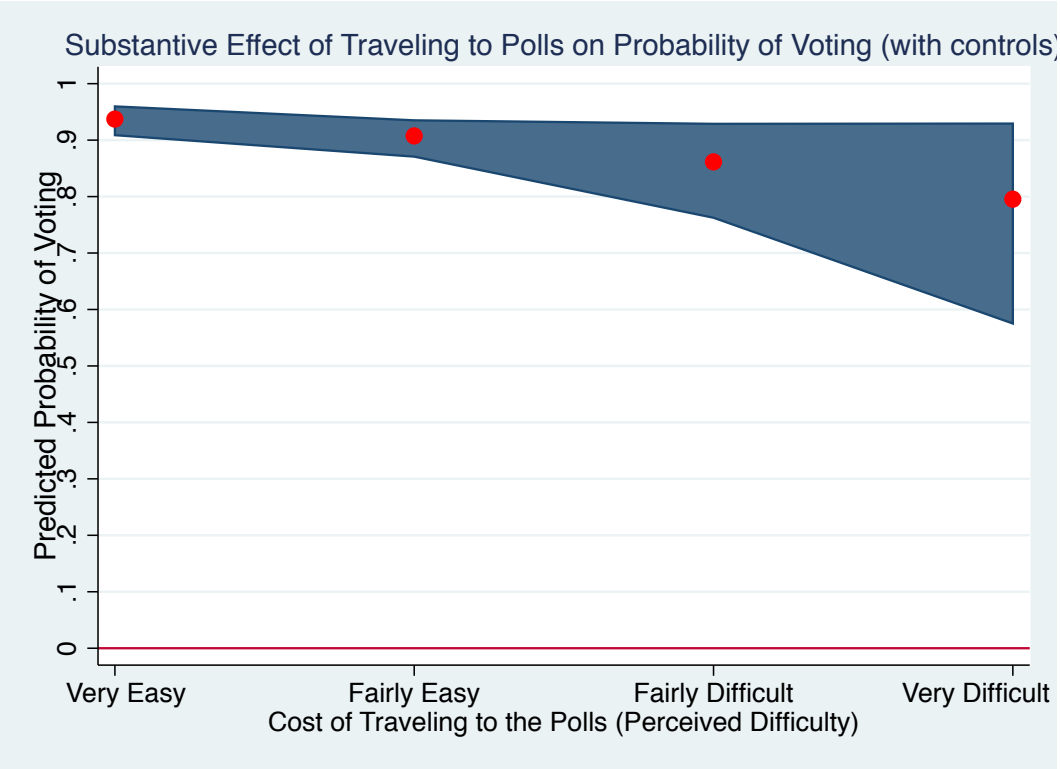


Figure 6 shows the substantive effect of the cost of traveling to the polling place on the predicted probability of voting. This substantive effect is calculated from Model 2 without controlling for the other task costs. Figure 6 shows that changing this task from the least difficult to the most difficult decreases the probability of voting by .413. Clearly this task has a very large impact on the probability of voting, suggesting that increasing transportation options may be a good strategy for increasing voter turnout.

Figure 7: Substantive Effect of Traveling to the Polls (with controls)



However, Figure 7 shows that this substantive effect is substantially reduced when the other task costs are controlled for. This substantive effect is calculated from Model 4, and it shows that changing the difficulty of traveling from "very easy" to "very difficult" decreases the probability of voting by only .058. This is less than 1/7 of the substantive effect calculated from Model 2 without controls! Clearly the cost of traveling to the polls is highly correlated with the other task costs.

Figure 8: Substantive Effect of Finding Time (without controls)

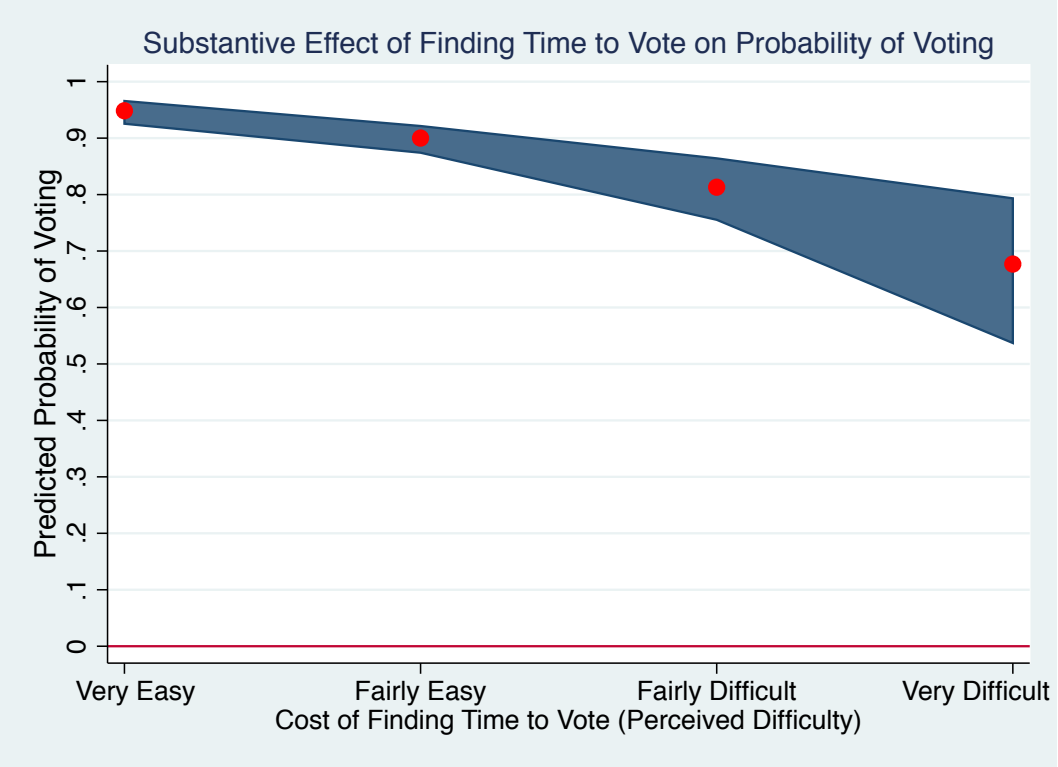


Figure 8 shows the substantive effect of the cost of finding time to vote on the predicted probability of voting. This substantive effect is calculated from Model 3 without controlling for the other task costs. Figure 8 shows that changing this task from the least difficult to the most difficult decreases the probability of voting by .270.

Figure 9: Substantive Effect of Finding Time (with controls)

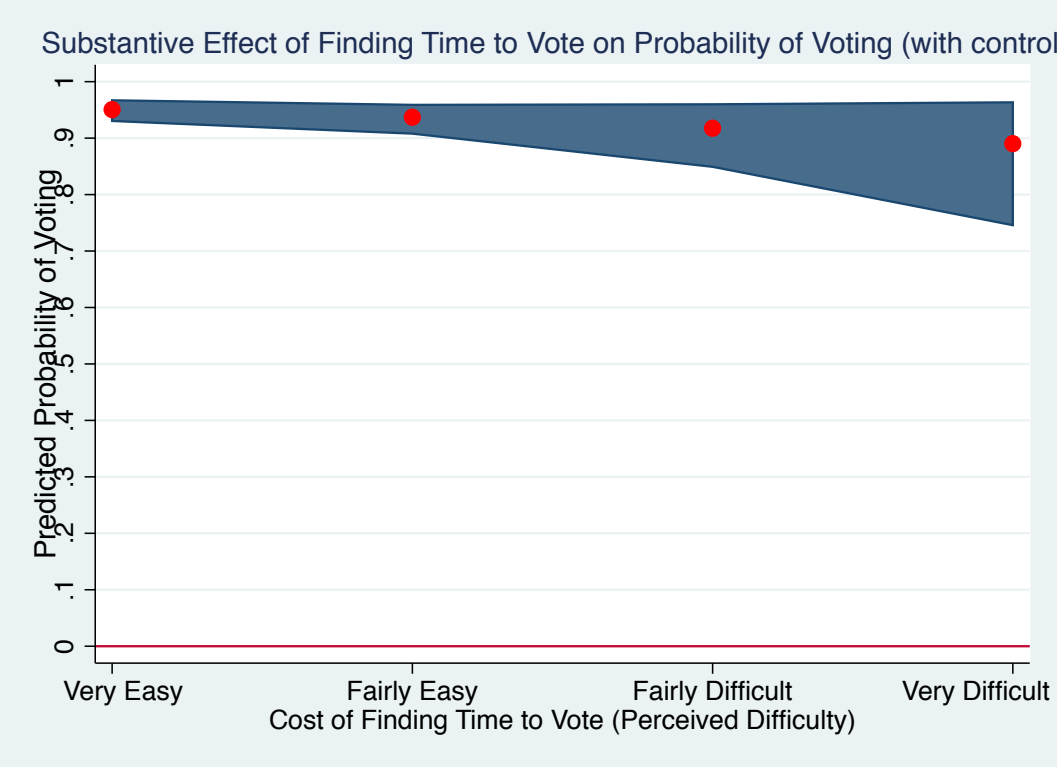


Figure 9 shows this same substantive effect, except calculated from Model 4 with control variables for the other cost areas. The impact of changing the difficulty of finding time to vote from the easiest to the hardest decreases the probability of voting by .142, which is more than half the substantive effect from Model 3 without controls. This is also the largest substantive effect of all three cost areas when the other cost areas are controlled for at their median values.

In summary, all three task costs have substantial impacts on the probability of a registered voter casting a ballot on Election Day. The impacts of each task cost are calculated as much larger if the other costs are not included as control variables, which is a clear indication of correlation between these task costs. This correlation makes interpretation of the results rather difficult.

If the full (both direct and indirect) impact of each cost area is considered, then traveling to the polling place is the cost area that has the largest impact on the probability of voting. However, if only the direct impact of transportation is

considered, this area has the smallest impact on the probability of voting. This suggests that the cost of traveling to the polls is not necessarily prohibitive by itself—rather, people who report difficulty traveling also report difficulty with other tasks, which in total make them less likely to vote.

When controlling for the other cost areas and only looking at the direct impact of costs, finding the polling place and finding time to vote are approximately tied in the magnitude and statistical certainty of their effects. Both reduce the probability of voting by around .13 to .14 even after controlling for their correlations with the other cost areas. This suggests that even if we account for all the other factors that make people less likely to vote, people who have trouble locating their polling place still are much less likely to cast a ballot. Similarly, having high opportunity costs of time make people much less likely to vote even when the other costs are low for them.

These findings have some implications for policies that might increase voter turnout by decreasing costs. Decreasing the cost of traveling to the polls may not have much impact by itself since this cost area is highly correlated with other costs—those who have difficulty with transportation also face high time and locating costs and will still face challenges in voting. However, policies aimed at making it easier to find the polling place could have a rather large impact (up to a .128 change in probability) if they successfully reduce this cost by itself. Public officials can introduce public education campaigns about how to find polling places, introduce mobile apps with this information, and make convenient websites to make locating the polls easier.

Similarly, policies aimed at making it easier to find time to vote can have a large impact of up to a .142 change in probability. While election officials cannot change one's work schedule or other obligations, they can reduce this cost by enacting policies like early voting that allow people a longer time window in which to vote. Other possibilities include a mandatory election holiday or laws that force employers to give employees time off to vote.

III. Impacts of the Costs of Voting on Vote Intention

Although validated voter turnout is the most accurate measure of voting behavior since it avoids the social desirability bias, researchers often have to use other measures. Most surveys do not collect enough personally identifying information to match survey responses with voting records, and collecting this information may not be allowed by institutional review boards. Even when matching is allowed, the matching process can miss many records if the sampling process was post-hoc matching rather than through an initial sampling from the voter file using voter IDs. For this reason many surveys rely on self-reported voting behavior rather than validated turnout.

My survey does not contain a self-reported voting measure since it was conducted prior to Election Day with no follow-up survey after the election. However, it does include a measure of voting intention. Since the survey was fielded less than a week before Election Day, this measure of intention is very proximate to the voting period. Reporting intention is clearly different from reporting behavior, although the two are clearly linked in psychological models of behavior (Sheeran 2002). Few studies have measured the difference between voting intention and actual voter behavior, but the authors of one study have pointed out that the measures are not equivalent and seem to respond differently to variables that predict voting (Achen & Blais 2010). These authors point out that intention is widely used as a proxy variable substituting for reported or validated turnout, even though intention is clearly a separate concept from a fulfilled action.

Given that vote intention is often used in political science literature as a proxy measure for voting behavior (Achen & Blais 2010), how the costs of voting affect intention should be of interest to many scholars of political participation. It should also be of interest to psychologists who study theories of behavior, such as the "theory of planned behavior" (Ajzen 1985). The psychological theories connecting intention to behavior do not directly address the concept of costs since they do not begin from a cost-benefit rational utility framework. However, they do

address topics like "perceived behavioral control" and "actual control" which can either prevent an intention from being formed or prevent its implementation (Fishbein & Ajzen 2015). As I describe in the following section, it is unclear how the concept of control relates to the concept of costs and benefits, or how the rational utility model can be joined with the generalized "reasoned action approach" of researchers like Fishbein and Ajzen. Understanding if and how voting costs affect intention to vote can shed some light on the connections between these theories.

III. i. Motivation: The Reasoned Action Approach vs. Rational Utility

Over the last few decades, researchers in the field of psychology have created a set of theories regarding the relationships between goals, intentions, and actions. For the most part these theories have become unified under the "reasoned action approach" (Fishbein & Ajzen 2015). According to these theories, a behavior is preceded by an intention to perform the behavior, which is preceded by the development of a desire to perform the behavior (Perugini & Bagozzi 2004; Sheeran 2002). Although these terms seem similar, they are distinguished as separate concepts in the social psychology literature and proceed in this causal order (Sheeran 2002). Desires are vague concepts of preferred end-states of being that precede intentions (Perugini & Bagozzi 2004). They reflect a vague desire to perform an action that is not accompanied by consideration of how the goal may be accomplished. In the context of a survey question, a desire to vote might be measured by agreement with the statement, "I want to vote in this upcoming election." On the other hand, behavior is directly influenced by the individual, his environment, and the ease by which he can perform the action (Sheeran 2002). In the context of a voter survey, the act of voting can be measured either by self-reported voting, i.e., "I voted in the election last November," or by validated voter histories. Therefore, desires and actions can be seen as two extremes of a continuum, where the obstacles to performing a behavior vary from unconsidered to actually being faced and possibly overcome.

Intentions lie somewhere between desires and behaviors, and their placement on this scale depends on how much the impediments and alternatives to the action are considered (Perugini & Bagozzi 2004). In the context of a voter survey, intention is usually measured by agreement with a statement like, "I intend to vote in this upcoming election." Since an individual's perceived behavioral control is linked to intention formation, scholars advocating the "theory of planned behavior" (TOPB) have thought that intentions capture all of same factors as those affecting behavior with the exception of unforeseen circumstances (Ajzen 1985). This argument has been made concerning voting behavior in particular (Netemeyer & Burton 1990; Netemeyer, Burton, & Johnston 1991). Under this theory, factors affecting implementation are included in intentions because intentions involve planning for how to undertake the action.

However, intention can also represent a more vague desire to undertake an action without an accompanying consideration of all the associated impediments and alternatives to the behavior. This type of intention has been labeled as a "goal intention"—it has a definitive desired end state and a discrete action needed to achieve it, but lacks the consideration of how that action can be performed (Gollwitzer 1993). There is considerable evidence that a statement of intention is closer to a vague goal unless the individual considers different strategies to implement this intention under various conditions that may arise (Gollwitzer et al. 2009; Gollwitzer 1993). So, we can consider the causal pathway as desires → goal intentions → implementation intentions → behaviors.

Scholars have found that following through on intention to vote is subject to the effect of prompting consideration of implementation scenarios (Nickerson & Rogers 2010). Among single-voter households, considering implementation plans and predicting how to respond to barriers increased turnout by over nine percentage points. This implies that for most people who state "I intend to vote," they have not considered all of obstacles to performing this action. Similarly, Imai et al. (2007) show that even simply asking how people intend to vote leads to an increase in turnout over intention alone. If a statement of an intention to vote can

be viewed as a goal intention rather than an implementation intention, then the obstacles to voting are not considered until after an intention is formed. The effect of prompting implementation scenarios may be partly due to the self-erasing nature of errors of prediction (Sherman 1980), which would also apply to self-predictions like pledges to vote (Burgess et al. 2000). However, it seems likely that at least part of the effect of implementation consideration is through the forming of plans that prompt specific actions in response to particular circumstances (Gollwitzer & Brandstatter 1997).

Other evidence that suggests that the statement "I intend to vote" is a goal intention devoid of implementation considerations comes from the literature comparing intention to vote to reported or validated votes. First, many people who say they intend to vote do not follow through with the behavior of voting (Achen & Blais 2010; Glaser 1958). This implies that they did not fully consider the factors that could make the act costly to them when stating their intention. Additionally, researchers have found that different characteristics of voters influence intention differently from actual voting (Achen & Blais 2010). For example, political interest and a sense of civic duty are more closely correlated with intention than with the act of voting. In the rational utility model of voting, these variables fall on the "benefit" side of the equation rather than the "cost" term. This implies that there are some factors that intervene in the actualization of the intention to vote, which are likely related to the costs of voting.

Achen and Blais's (2010) findings suggest that only the "benefits" of voting, whether they come from social rewards, psychological benefits, or expected policy outcomes, lead to the goal intention of voting. Some people have this intention due to the habit of performing this action many times in the past (Aldrich, Montgomery, & Wood 2011; Gerber, Green, & Shachar 2003). Others develop the intention from interacting with their friends and coworkers in their social networks who subtly or directly pressure them to vote as well (Gerber et al. 2015; McClurg 2003). Still other people are activated and mobilized by campaigns through advertisements and political messaging (Huber & Arceneaux 2007) or directly through canvassing or

other forms of contact (Arceneaux & Nickerson 2009). Regardless of the process that led them to this point, they all develop the goal of voting and its attendant intention to achieve the goal.

III. ii. Theory and Hypotheses

According to the psychological literature on intention, people develop the goal intention for an action prior to considering how to actually perform this action in specific detail. After the goal is formed, they consider how to implement this intention via the opportunities available to them. This suggests that the goal intention of voting is formed independently and causally prior to the voters considering the costs associated with casting a ballot. When the literature on creating voting plans (aka implementation intentions) is considered together with Achen and Blais's (2010) findings about which factors affect intention, one implication becomes clear: reporting intention to vote may merely reflect a vague goal intention rather than a carefully planned implementation intention. If implementation intention is the stage at which costs enter the decision whether or not to vote by being seen as obstacles or behavioral "control," this implies that vote intention should not reflect the costs of voting. This implication of the behavioral theories and these findings is the motivation for the following sub-section and my first hypothesis for this section:

11: The costs of voting should not significantly decrease the likelihood of reporting an intention to vote.

On the other hand, it is possible that the intentions reported in my survey are not vague goal intentions, but rather well-defined "implementation intentions" to use the language of Gollwitzer (1993). In the theory of reasoned action, these types of intentions are shaped by "actual control" as well as the prior goal intention. Factors that shape "actual control" are environmental factors as well as skills and abilities of the person (Fishbein & Ajzen 2015). These factors share much similarity to the factors that I describe in Chapter 1 in regards to what shapes the costs of voting. This suggests that if my survey respondents were reporting

"implementation intentions" that already incorporated factors of control, they may have already considered the costs of voting and reported intention accordingly. Those who face high costs of voting may consider that they have little control over performing the behavior, and therefore would not report an intention to vote. Since my survey was fielded in the last 4 days prior to Election Day, it is possible that many respondents considered these costs or "actual control" and reported their intentions after already considering these factors. This leads to a second hypothesis that is directly counter to Hypothesis 11:

12: Those who report higher costs of voting should be less likely to report an intention to vote.

III. iii. Statistical Models

Testing the effects of the costs of voting on vote intention, at least to extent possible with my dataset, is a fairly straightforward process. Similar to the earlier analysis on the effects of voting costs on validated voter turnout, I employ logistic regressions of vote intention, where 1 = "I intend to vote" and 0 = "otherwise," including if the respondent replied with "maybe" or "I don't know." I first regress the general perceived cost of voting on intention to see this bivariate relationship, and then I use the three perceived task costs to see which of the tasks, if any, shapes self-reported intention to vote.

Table 46 shows the results of these models. It is clear from Model 1 that the respondents in my survey were significantly less likely to report intending to vote if they reported higher overall costs of voting. This relationship is not just highly statistically significant, but also substantively meaningful. Moving from a 2 ("fairly easy") to a 3 ("fairly difficult") on the difficulty/cost measure decreases one's likelihood of voting by .197, which is a considerable effect! This is strong evidence against the null effect prediction of Hypothesis 11 and in favor of the rival Hypothesis 12.

Table 46: Impact of the Costs of Voting on Vote Intention

Intention to Vote in the 2016 Election	Model 1	Model 2
Overall difficulty of voting	-1.201***	
	(0.210)	
Finding out where to vote		-0.200
		(0.182)
Traveling to the polling place		-0.238
		(0.287)
Finding time to vote		-1.195***
		(0.286)
Constant	5.548***	6.502***
	(0.541)	(0.634)
Pseudo *R*-squared	.121	.192
Observations	740	745

Note: Standard errors in parentheses. ^{t} $p < 0.1$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Model 2 in Table 46 shows that the relationship between overall costs of voting and vote intention is being driven almost entirely by one task of voting: finding time to vote. While the perceived costs of traveling to the polls and finding the polls were completely statistically insignificant, the cost of finding time to vote has a highly significant and substantively large relationship with vote intention. Moving from a 2 ("fairly easy") to a 3 ("fairly difficult") on the cost of finding time to vote (while the other costs are held at 3) decreases one's likelihood of voting by .110.

While Model 2 provides suggestive evidence that finding time to vote is the only task that affects vote intention, this model may be hiding relationships between the other task costs and intention. Since the model includes all three task costs, and they are all correlated with each other, the presence of all three in the model may be hiding bivariate relationships between the costs and intention to vote.

Table 47: Bivariate Relationships between Costs and Vote Intention

	Model 1	Model 2	Model 3
Locating Polling Place	-0.739***		
	(0.144)		
Traveling to the Polls		-1.115***	
		(0.202)	
Finding Time to Vote			-1.513***
			(0.215)
Constant	4.514***	4.938***	6.422***
	(0.389)	(0.439)	(0.604)
Psuedo *R*-squared	.089	.100	.202
Observations	757	757	758

Note: Standard errors in parentheses. ^{t} $p < 0.1$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Table 47 shows the results of bivariate logistic regressions of the three task costs separately on intention to vote. When the task costs are regressed on intention separately, they all show highly significant relationships with vote intention. However, the strongest relationship is between finding time to vote and intention, and finding time to vote explains twice the amount of variance in vote intention as the other measures.

III. iv. Implications of Findings on Costs and Vote Intention

What can be concluded from this analysis? First, vote intention as measured in my survey is definitely affected by the costs of voting, as shown by all five models in both tables. This is clear evidence against Hypothesis 11 and in favor of Hypothesis 12, but this conclusion should be limited to the context of this survey. The survey was fielded only a week prior to Election Day, with some people completing it the day before voting. This means that my measure of vote intention is very proximate to the action itself, which by the reasoned action model makes it more likely to reflect factors that influence "actual control" over the action (Fishbein

& Ajzen 2015). In the pathway from goals to intentions to actions, the point at which actual control factors are being considered is when planning occurs. In the terms of Gollwitzer (1993), the reported intention should be considered an "implementation intention" since the respondents had already considered control factors and made plans accordingly.

Essentially the finding of support for Hypothesis 12 means that the respondents to my survey were reporting intentions that were already thoroughly considered. At least to some extent, they had planned how they would vote and considered the behavioral control factors that might present as obstacles to them fulfilling their intentions. This relationship between costs and intention may only be present later in the election season when people have begun to plan how and when they will vote. If I had conducted this survey much earlier in the campaign season, this relationship may not exist to the same degree. Therefore, we cannot conclude that voting intention always reflects the costs of voting. We can, however, conclude that vote intentions measured proximately to the voting period will be influenced by these costs, suggesting voters consider these costs as they plan their actions for Election Day.

This finding also suggests a way in which the reasoned action approach can be connected with the rational utility model. The "actual control" factors are analogous to the costs of voting in that to the individual voter, a cost that is too high (like losing one's job to go vote) can appear to be an insurmountable obstacle that prevents "actual control" over an action. As the trade-offs associated with tasks increase, people reach a point at which the costs appear to prevent their control over taking the action they intended to take. While this is not the same decision-making logic as weighing costs vs. benefits, the predictions of both theories would be equivalent.

Regarding the relationships between the different task costs and vote intention, it appears that voters primarily think about the difficulty of finding time to vote when they report whether or not they intend to vote. While all three task

costs show significant correlations with intention in bivariate regressions, this may merely be a result of the correlation between the three task costs. It is unclear whether voters consider the costs of finding and traveling to the polls when reporting vote intention since these relationships are only present when the other costs are not controlled for.

IV. Overall Conclusions and Implications

In Chapter 1, I developed a new conceptualization of the costs of voting that depends on the tasks people must complete to vote and their attendant individual-specific trade-offs. While the tasks are shaped by environment the voter is situated in, including election administration and geography, the trade-offs are largely shaped by individual life circumstances and personal factors. This theory moves the literature on the costs of voting forward in that it incorporates the economic concept of opportunity costs and considers that the costs of voting vary as much from personal circumstances as they do from the tasks that must be completed.

In Chapter 2, I created a unique survey to measure these voting costs for registered voters in Pennsylvania and connect them to vote intention and validated voter turnout. While this survey sampling shows some biases toward more educated and more frequent voters, there is considerable variation on socio-economic measures and life circumstances like having children. This survey is the first survey in the political science literature to measure all three task costs and the factors that influence each task, and is also the first in the United States to connect survey measures of costs to validated voter turnout information. This chapter also demonstrated that the task cost most often reported as high is the difficulty of finding time to vote, for which around 15% of respondents reported difficulty.

In Chapter 3, I demonstrated that the survey responses on the costs of voting largely reflect my hypothesized structure of voting costs, in which overall costs are shaped by the three task costs of finding time to vote, locating the polls, and traveling to the polling place. I also showed how self-reported perceived costs for each task area accurately reflect objectively measureable factors that should

influence the costs of each task. The finding that perceived costs largely reflect objective factors shows that voters are aware of the costs they face and are reporting answers consistent with these costs rather than based on a social desirability bias or internal motivation to vote. While some have pointed out a concern that respondents might report higher perceived difficulty as an excuse for their not voting (even though their costs are actually low), the finding that perceived costs correspond to objective factors is evidence against this problem. This finding is important for future studies on the costs of voting because surveys can efficiently measure the costs of each task through only three or four perceived difficulty questions.

Chapter 3 also shows that the costs of voting are mostly distinct from the usual measures of socio-economic status (SES): income and education. Although there is some correlation between homeownership and costs, likely due to residential stability, this correlation explains little of the variance in the costs. This means that when voting policies are enacted that reduce costs, they may end up mobilizing medium- or high-SES voters instead of just low-SES voters since costs may be high even for a middle-class educated person. It also suggests that the resource theory is far from a complete explanation for how SES affects participation. Since SES does not affect costs very much, the other pathways between SES and participation should be explored further to see how SES shapes the benefits of voting, childhood socialization into participation, and neighborhood mobilization. I plan to explore these mechanisms connecting SES to participation in future studies.

In this final chapter I demonstrated how the costs of voting affect both validated voter turnout and self-reported intention to vote. The correlation between the task costs makes it difficult to specify the exact impact of the costs on voting, but it is clear that the costs of voting substantially decrease the probability of voting. Although some of the literature on vote intention would suggest that self-reported intention may not incorporate voting costs, my survey data demonstrate that intention to vote is highly influenced by the costs of voting. This may be dependent on the context of this survey, which was fielded just prior to Election

Day. It is possible that intention measured weeks or months before the voting period may not reflect the impact of these costs as much, as voters likely make their voting plans as Election Day approaches. In a future study, I plan to measure voting costs and vote intention at different time points prior to Election Day. This would allow me to see at which point the costs of voting start to be considered by potential voters and suggest when voters start to solidify their vote intention from more vague goal to a specific implementation intention.

Chapter 4 also contains some interesting findings on which costs of voting have the largest impact on intention and validated voting. In particular, the cost of traveling to the polls has a very substantial impact on the likelihood that a registered voter casts a ballot. However, this effect largely disappears when the other costs are included in the same model, and locating the polls and finding time to vote have larger impacts in the full model with controls. This means it is not clear how much impact the transportation cost has on the probability of voting by itself. Can we consider the impact of not having a car separately from the circumstances that affect the other costs too, like working a low-paying hourly job? It is not clear how to handle the cost correlation, but it is interesting that different task costs have stronger effects on behavior than on intention. For intention to vote the cost of finding time to vote has the largest impact, and the other task costs only have significant relationships with vote intention in bivariate relationships.

Taken together, these findings suggest that potential voters consider different factors when developing an intention to vote vs. when they actually show up or not. Vote intention reflect factors that shape the cost of finding time to vote like taking time off work or finding childcare, but does not seem to reflect transportation or poll-locating difficulties as much. However, transportation obstacles may have a very large effect on whether a voter actually shows up and casts a ballot even if they were not considered when they reported a vote intention. This finding means that intention is not a perfect proxy for validated voting when researchers are looking at the impact of voting costs or factors that shape them, such as election laws. It also means that while voters are creating implementation

plans when reporting intention (at least proximate to Election Day), they may not consider every relevant factor or cost. Campaigns seeking to increase turnout might focus on helping voters develop specific plans to manage their transportation to and from the polls to help translate vote intention into actual behavior. In a future study, I plan to see how inducing implementation intentions through prompting potential voters to make plans affects each of these task costs and their impacts on actual turnout.

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Appendix: Survey Questions

V1: Do you intend to vote in the upcoming Presidential election in November?

1. Yes
2. Maybe
3. No
4. I don't know
5. I already voted

V2: How often do you vote in local, state, and national elections?

1. More than once a year
2. At least once a year
3. At least once every two years
4. At least once every four years
5. Rarely
6. I've never voted before
7. I don't know

V3: Do you like to go vote with other people like neighbors, family, friends, or coworkers? Or do you prefer to go to your polling place by yourself?

1. I prefer to go vote with others
2. I prefer to go vote by myself
3. I don't know

V4: When you go to your polling place to vote do you usually know the people running the polls or waiting to vote? Or are they usually strangers to you?

1. I know almost everyone where I vote
2. I know most people where I vote
3. I know some people where I vote, but not most
4. I know a few people where I vote
5. I don't know anyone where I vote
6. I don't know

V5: Voting often can be difficult or inconvenient for people because it requires figuring out where to vote, finding time to vote, travelling to the polls, and waiting in line. All things considered, how difficult or inconvenient is it for you to vote in a typical election?

1. Very easy / convenient
2. Fairly easy / convenient
3. Fairly difficult / inconvenient
4. Very difficult / inconvenient
5. I don't know

V6: How difficult is it for you to figure out where you are assigned to vote in this Novembers election? In other words, how hard is it to find out where your neighborhood polling place is?

1. I already know where I go to vote
2. Very easy
3. Fairly easy
4. Fairly difficult
5. Very difficult
6. I don't know

V7: Where do you expect to be during most of the day on Tuesday, November 8th (Election Day)?

1. At home
2. At work
3. At school
4. Running errands
5. Somewhere else
6. I don't know

V8: If you vote in this upcoming election on Tuesday, November 8, how long do you expect it will take for you to travel to your polling place to vote? Think about where you would be during the day, where your voting location is, and how you would get there. If you don't know where your polling place is, assume it is two miles away from your home.

1. Less than 10 minutes
2. 10 to 20 minutes
3. 20 to 30 minutes
4. 30 to 40 minutes
5. 40 to 50 minutes
6. 50 minutes to an hour
7. 1 hour to 2 hours
8. Over 2 hours
9. I don't know

V9: To vote in Pennsylvania, you have to travel to your assigned neighborhood polling place on Election Day before 7:00 PM. Considering your transportation options and where you will be during the day on Tuesday, how difficult is it for you to travel to your voting location?

1. Very easy
2. Fairly easy
3. Fairly difficult
4. Very difficult
5. I don't know

V10: If you vote in this election on November 8th, how long do you expect to wait in line at your polling place?

1. Less than 10 minutes
2. 10 to 20 minutes
3. 20 to 30 minutes
4. 30 to 40 minutes
5. 40 to 50 minutes
6. 50 minutes to an hour
7. 1 hour to 2 hours
8. 2 hours to 3 hours
9. Over 3 hours
10. I don't know

V11: Voting requires you to set aside some time to travel to your polling place and wait in line. How difficult is it for you to find time to vote on Election Day?

1. Very easy
2. Fairly easy
3. Fairly difficult
4. Very difficult
5. I don't know

V12: Do you have a current driver's license?

1. Yes
2. No
3. I don't know

V13: On a typical Tuesday, do you have access to a vehicle you can drive?

1. Yes
2. No
3. I don't know

V14: Do you use public transportation such as the bus, train, or subway in your town or city?

1. Yes, I use them often
2. I use them sometimes
3. I have used them, but only rarely
4. No, I have never used these services
5. I don't know

V15: From where you are during the day on a typical Tuesday, how difficult is it for you to use public transportation (bus, train, subway, etc.) to get around town?

1. Very easy
2. Fairly easy
3. Fairly difficult
4. Very difficult
5. I don't know

V16: Do you use ride-sharing services like Uber, Lyft, or other similar services?

1. Yes, I use them often
2. I use them sometimes
3. I have used them, but only rarely
4. No, I have never used these services
5. I don't know

V17: From where you are during the day on a typical Tuesday, how difficult is it for you to use ride-sharing services like Uber and Lyft to get around town?

1. Very easy
2. Fairly easy
3. Fairly difficult
4. Very difficult
5. I don't know

V18: What is your employment situation? Are you currently working for pay?

1. Yes, I have a job at the moment
2. Yes, but I am temporarily on leave
3. No, I am currently unemployed
4. No, I am disabled or retired
5. No, I am currently a student
6. No, I am a homemaker or stay-at-home parent
7. Other

V18o: (Other category description)

V19: How many hours do you work in a typical week?

1. 35 to 45 hours per week
2. 45 of more hours per week
3. 20 to 35 hours per week
4. Other

V20: Do you set your own schedule for work? Or do you have a fixed schedule of hours you must be at work?

1. My schedule is fixed and I can't easily change it
2. Part of my schedule is fixed, and I set the rest
3. I set my own schedule
4. My schedule depends on the week
5. Other

V21: On a typical Tuesday what times of the day are you usually working? Please check all that apply.

V21m: (mornings)
. / 1

V21a: (afternoons)
. / 1

V21e: (evenings)
. / 1

V21n: (nighttime)
. / 1

V21le: (late nights/early mornings)
. / 1

V21na: (none)
. / 1

V21d: (it depends on the week)
. / 1

V22: Sometimes people need to take off work for a few hours for reasons like a family emergency, a doctor's visit, or running important errands. In general, how difficult is it for you to leave work for a few hours?

1. Very easy
2. Fairly easy
3. Fairly difficult
4. Very difficult
5. I don't know

V23: Consider a situation where you need to leave work for a couple hours during your normal working hours. This could be for something like a family emergency, doctor's appointment, or an important errand. Would you still be paid for the time you are gone? Or would you not be paid for this time?

1. I would still be paid when gone from work for a couple hours
2. I would not be paid when I'm not at work for any reason
3. It depends on the situation
4. I don't know

V24: Do you currently attend college graduate school or any classes? Please choose the category that most applies to you.

1. I am a high school student
2. I am a full-time college student
3. I am a part-time college student
4. I am a full-time graduate student
5. I am a part-time graduate student
6. No, I am not currently a student
7. Other _____

V24o: (other description)

V25: On a typical Tuesday, do you have classes, labs, or other required school activities?

1. Yes, most of the day
2. Yes, part of the day
3. Yes, only at night (after 7 PM)
4. No
5. Other

V26: Sometimes people need to miss school due to things like a family emergency, a doctor's visit, or running important errands. In general, how difficult is it for you to miss school for a few hours?

1. Very easy
2. Fairly easy
3. Fairly difficult
4. Very difficult
5. I don't know

V27: Do you currently take care of children or other dependents?

1. Yes, I take care of children
2. Yes, I am a caretaker
3. Yes, I am a nanny
4. Sometimes
5. No

V28: During the day on a typical Tuesday, are you taking care of children or other dependents?

1. Yes, all of the day
2. Yes, part of the day
3. No
4. It depends on the week

V29: Sometimes people need to leave their children or dependents with a caretaker or babysitter for a few hours for things like a family emergency, a doctor's visit, or running important errands. In general, how difficult is it for you to have someone else watch your children or dependents for a few hours?

1. Very easy
2. Fairly easy
3. Fairly difficult
4. Very difficult
5. I don't know

V30: Some people hate waiting in long lines, while others don't mind it much. On a scale from 1 to 5 how much do you dislike waiting in lines?

1. (I don't mind waiting in line at all)
2.
3.
4.
5. (I really hate waiting in line)
6. I don't know

V31: Visiting a government office like the Dept. of Motor Vehicles (DMV) can be difficult or inconvenient for people because it requires locating the office, traveling there, and waiting in line. All things considered, how difficult or inconvenient is it for you to visit a government office like the DMV?

1. Very easy / convenient
2. Fairly easy / convenient
3. Fairly difficult / inconvenient
4. Very difficult / inconvenient
5. I don't know

V32: Imagine for a moment you need to visit the Dept. of Motor Vehicles (DMV) to get a new drivers license. If you could pay someone to wait in line and get the license for you how much money (in $) would you offer them? Assume that this activity takes two hours.

$_____

V33: What is the highest level of education you have completed or the highest degree you have received?

1. Less than 9th grade
2. 10th grade
3. 11th grade
4. 12th grade, no HS diploma
5. High School graduate or equivalent (GED, etc.)
6. Some college, no degree
7. Associate degree
8. Bachelor's degree (BA, BS, AB, etc.)
9. Master's degree (MA, MS, MBA, etc.)
10. Professional School (MD, DDS, LLB, JD, etc.)
11. Doctoral Degree (PhD, EdD, D. Phil., etc.)

V34: Which of the following best describes where you currently live?

1. I own my home
2. I rent my home
3. I live in a dorm or other community housing
4. I live with my parents or other family in their home
5. I live in an assisted care facility or nursing home
6. Other

V35: Which of the following racial and/or ethnic categories would you use to describe yourself? Please check all that apply.

V35w: (White, Anglo, or Caucasian)
. / 1

V35b: (Black or African American)
. / 1

V35h: (Hispanic or Latino)
. / 1

V35a: (Asian or Pacific Islander)
. / 1

V35i: (Native American, American Indian, or Alaskan Native)
. / 1

V35o: (Other)
. / 1

V36: How many children under the age of 12 live in your household?

1. No children
2. One child
3. Two children
4. Three children
5. Four children
6. More than four children

V37: How many children between the ages of 12 and 18 live in your household?

1. No children
2. One child
3. Two children
4. Three children
5. Four children
6. More than four children

V38: What is your approximate yearly household income? Your answers will be kept confidential.

1. Less than $10,000
2. $10,000 to $30,000
3. $30,000 to $50,000
4. $50,000 to $70,000
5. $70,000 to $90,000
6. $90,000 to $120,000
7. $120,000 to $150,000
8. $150,000 to $180,000
9. $180,000 to $210,000
10. Above $210,000
11. I don't know
12. I prefer not to answer